

**GENE PRODUCTS DIFFERENTIALLY EXPRESSED IN CANCEROUS BREAST
CELLS AND THEIR METHODS OF USE****10/501187****DT04 Rec'd PCT/PTO 08 JUL 2004****STATEMENT OF RIGHTS OF INVENTION**

5 The United States Government has certain rights in this invention pursuant to a CRADA (BG98-053) between Chiron Corporation and the University of California, which operates the Lawrence Berkeley National Laboratory for the United States Department of Energy under Contract No. DE-AC03-76SF00098.

CROSS-REFERENCING.

10 This patent application claims the benefit of U.S. provisional application serial number 60/345,637 filed January 8, 2002, which application is incorporated by reference in its entirety.

FIELD OF THE INVENTION

15 The present invention relates to polynucleotides of human origin in substantially isolated form and gene products that are differentially expressed in breast cancer cells, and uses thereof.

BACKGROUND OF THE INVENTION

20 Cancer, like many diseases, is not the result of a single, well-defined cause, but rather can be viewed as several diseases, each caused by different aberrations in informational pathways, that ultimately result in apparently similar pathologic phenotypes. Identification of polynucleotides that correspond to genes that are differentially expressed in cancerous,
25 pre-cancerous, or low metastatic potential cells relative to normal cells of the same tissue type, provides the basis for diagnostic tools, facilitates drug discovery by providing for targets for candidate agents, and further serves to identify therapeutic targets for cancer therapies that are more tailored for the type of cancer to be treated.

30 Identification of differentially expressed gene products also furthers the understanding of the progression and nature of complex diseases such as cancer, and is key to identifying the genetic factors that are responsible for the phenotypes associated with development of, for example, the metastatic phenotype. Identification of gene products that are differentially expressed at various stages, and in various types of cancers, can both provide for early diagnostic tests, and further serve as therapeutic targets. Additionally, the

product of a differentially expressed gene can be the basis for screening assays to identify chemotherapeutic agents that modulate its activity (e.g. its expression, biological activity, and the like).

5 Early disease diagnosis is of central importance to halting disease progression, and reducing morbidity. Analysis of a patient's tumor to identify the gene products that are differentially expressed, and administration of therapeutic agent(s) designed to modulate the activity of those differentially expressed gene products, provides the basis for more specific, rational cancer therapy that may result in diminished adverse side effects relative to conventional therapies. Furthermore, confirmation that a tumor poses less risk to the patient
10 (e.g., that the tumor is benign) can avoid unnecessary therapies. In short, identification of genes and the encoded gene products that are differentially expressed in cancerous cells can provide the basis of therapeutics, diagnostics, prognostics, therametrics, and the like.

Breast cancer is a leading cause of death among women. One of the priorities in breast cancer research is the discovery of new biochemical markers that can be used for
15 diagnosis, prognosis and monitoring of breast cancer. The prognostic usefulness of these markers depends on the ability of the marker to distinguish between patients with breast cancer who require aggressive therapeutic treatment and patients who should be monitored.

While the pathogenesis of breast cancer is unclear, transformation of non-tumorigenic breast epithelium to a malignant phenotype may be the result of genetic factors, especially in women under 30 (Miki, et al., Science, 266: 66-71, 1994). However, it is likely
20 that other, non-genetic factors are also significant in the etiology of the disease. Regardless of its origin, breast cancer morbidity increases significantly if a lesion is not detected early in its progression. Thus, considerable effort has focused on the elucidation of early cellular events surrounding transformation in breast tissue. Such effort has led to the identification
25 of several potential breast cancer markers.

Thus, the identification of new markers associated with breast cancer, and the identification of genes involved in transforming cells into the cancerous phenotype, remains a significant goal in the management of this disease. In exemplary aspects, the invention described herein provides breast cancer diagnostics, prognostics, therametrics, and
30 therapeutics based upon polynucleotides and/or their encoded gene products.

SUMMARY OF THE INVENTION

The present invention provides methods and compositions useful in detection of cancerous cells, identification of agents that modulate the phenotype of cancerous cells, and

identification of therapeutic targets for chemotherapy of cancerous cells. Cancerous breast cells are of particular interest in each of these aspects of the invention. More specifically, the invention provides polynucleotides in substantially isolated form, as well as polypeptides encoded thereby, that are differentially expressed in breast cancer cells. Also provided are antibodies that specifically bind the encoded polypeptides. These polynucleotides, polypeptides and antibodies are thus useful in a variety of diagnostic, therapeutic, and drug discovery methods. In some embodiments, a polynucleotide that is differentially expressed in breast cancer cells can be used in diagnostic assays to detect breast cancer cells. In other embodiments, a polynucleotide that is differentially expressed in breast cancer cells, and/or a polypeptide encoded thereby, is itself a target for therapeutic intervention.

Accordingly, in one aspect the invention provides a method for detecting a cancerous breast cell. In general, the method involves contacting a test sample obtained from a cell that is suspected of being a breast cancer cell with a probe for detecting a gene product differentially expressed in breast cancer. Many embodiments of the invention involve a gene identifiable or comprising a sequence selected from the group consisting of SEQ ID NOS: 1-499, contacting the probe and the gene product for a time sufficient for binding of the probe to the gene product; and comparing a level of binding of the probe to the sample with a level of probe binding to a control sample obtained from a control breast cell of known cancerous state. A modulated (i.e. increased or decreased) level of binding of the probe in the test breast cell sample relative to the level of binding in a control sample is indicative of the cancerous state of the test breast cell. In certain embodiments, the level of binding of the probe in the test cell sample, usually in relation to at least one control gene, is similar to binding of the probe to a cancerous cell sample. In certain other embodiments, the level of binding of the probe in the test cell sample, usually in relation to at least one control gene, is different, i.e. opposite, to binding of the probe to a non-cancerous cell sample. In specific embodiments, the probe is a polynucleotide probe and the gene product is nucleic acid. In other specific embodiments, the gene product is a polypeptide. In further embodiments, the gene product or the probe is immobilized on an array.

In another aspect, the invention provides a method for assessing the cancerous phenotype (e.g., metastasis, metastatic potential, aberrant cellular proliferation, and the like) of a breast cell comprising detecting expression of a gene product in a test breast cell sample, wherein the gene comprises a sequence selected from the group consisting of SEQ ID NOS: 1-499; and comparing a level of expression of the gene product in the test breast cell sample with a level of expression of the gene in a control cell sample. Comparison of the level of

expression of the gene in the test cell sample relative to the level of expression in the control cell sample is indicative of the cancerous phenotype of the test cell sample. In specific embodiments, detection of gene expression is by detecting a level of an RNA transcript in the test cell sample. In other specific embodiments detection of expression of the gene is by
5 detecting a level of a polypeptide in a test sample.

In another aspect, the invention provides a method for suppressing or inhibiting a cancerous phenotype of a cancerous cell, the method comprising introducing into a mammalian cell an expression modulatory agent (e.g. an antisense molecule, small molecule, antibody, neutralizing antibody, inhibitory RNA molecule, etc.) to inhibition of expression
10 of a gene identified by a sequence selected from the group consisting of SEQ ID NOS: 1-499. Inhibition of expression of the gene inhibits development of a cancerous phenotype in the cell. In specific embodiments, the cancerous phenotype is metastasis, aberrant cellular proliferation relative to a normal cell, or loss of contact inhibition of cell growth. In the context of this invention "expression" of a gene is intended to encompass the expression of
15 an activity of a gene product, and, as such, inhibiting expression of a gene includes inhibiting the activity of a product of the gene.

In another aspect, the invention provides a method for assessing the tumor burden of a subject, the method comprising detecting a level of a differentially expressed gene product in a test sample from a subject suspected of or having a tumor, the differentially expressed
20 gene product comprising a sequence selected from the group consisting of SEQ ID NOS: 1-499. Detection of the level of the gene product in the test sample is indicative of the tumor burden in the subject.

In another aspect, the invention provides a method for identifying a gene product as a target for a cancer therapeutic, the method comprising contacting a cancerous cell expressing
25 a candidate gene product with an anti-cancer agent, wherein the candidate gene product corresponds to a sequence selected from the group consisting of SEQ ID NOS: 1-499; and analyzing the effect of the anti-cancer agent upon a biological activity of the candidate gene product and/or upon a cancerous phenotype of the cancerous cell. Modulation of the biological activity of the candidate gene product and modulation of the cancerous phenotype
30 of the cancerous cell indicates the candidate gene product is a target for a cancer therapeutic. In specific embodiments, the cancerous cell is a cancerous breast cell. In other specific embodiments, the inhibitor is an antisense oligonucleotide. In further embodiments, the cancerous phenotype is aberrant cellular proliferation relative to a normal cell, or colony formation due to loss of contact inhibition of cell growth.

In another aspect, the invention provides a method for identifying agents that modulate (i.e. increase or decrease) the biological activity of a gene product differentially expressed in a cancerous cell, the method comprising contacting a candidate agent with a differentially expressed gene product, the differentially expressed gene product

5 corresponding to a sequence selected from the group consisting of SEQ ID NOS: 1-499; and detecting a modulation in a biological activity of the gene product relative to a level of biological activity of the gene product in the absence of the candidate agent. In specific embodiments, the detecting is by identifying an increase or decrease in expression of the differentially expressed gene product. In other specific embodiments, the gene product is
10 mRNA or cDNA prepared from the mRNA gene product. In further embodiments, the gene product is a polypeptide.

In another aspect, the invention provides a method of inhibiting growth of a tumor cell by modulating expression of a gene product, where the gene product is encoded by a gene identified by a sequence selected from the group consisting of: SEQ ID NOS:1-499.

15 The invention provides a method of determining the cancerous state of a cell, comprising detecting a level of a product of a gene in a test cell wherein said gene is defined by a sequence selected from a group consisting of SEQ ID NOS:1-499 wherein the cancerous state of the test cell is indicated by detection of said level and comparison to a control level of said gene product. In certain embodiments of this method, the gene product
20 is a nucleic acid or a polypeptide. In certain embodiments of this method, the gene product is immobilized on an array. In one embodiment of this method, the control level is a level of said gene product associated with a control cell of known cancerous state. In other embodiments of this method, the known cancerous state is a non-cancerous state. In another embodiment of this method, the level differs from the control level by at least two fold,
25 indicating the test cell is not of the same cancerous state as that indicated by the control level.

The invention also provides a method for detecting a cancerous breast cell in a sample. This method involves detecting a level of a product of a gene in a test sample obtained from a subject wherein said gene is defined by a sequence selected from a group
30 consisting of SEQ ID NOS:1-499, wherein the presence of a cancerous breast cell or metastasized breast cancer cell is indicated by detection of said level and comparison to a control level of said gene product. In certain embodiments of this method, the sample is a sample of breast tissue. In certain other embodiments of this method, the sample is selected from the group consisting of a liver, brain, kidney, lung, bone and skin sample. In one

embodiment of this method, the cancerous breast cell is a metastasized cancerous breast cell. In certain other embodiments of the method, the control level is a level of said gene product associated with a control sample containing cells of known cancerous state. In another embodiment, the known cancerous state is a non-cancerous state.

5 The invention also provides a method for suppressing a cancerous phenotype of a cancerous mammalian cell comprising introducing into said cancerous cell an antisense polynucleotide for inhibition of expression of a gene defined by a sequence selected from the group consisting of SEQ ID NOS: 1-499, wherein inhibition of expression of said gene suppresses development of said cancerous phenotype. In many embodiments of the method,
10 the cancerous phenotype is metastatic. In certain embodiments of the method, the cancerous phenotype is aberrant cellular proliferation relative to a normal cell. In other embodiments of the method, the cancerous phenotype is loss of contact inhibition of cell growth. In certain other embodiments of the method, the cancerous phenotype is aberrant cellular proliferation of a metastasized breast cancer cell relative to a normal cell.

15 The invention further provides a method for assessing the tumor burden of a subject. This method involves detecting a level of a differentially expressed gene product in a test sample from a subject suspected of having a tumor, the differentially expressed gene product comprising a sequence selected from the group consisting of SEQ ID NOS: 1-499; wherein detection of the level of the gene product in the test sample is indicative of the tumor burden
20 in the subject.

 The method further provides a method for identifying a gene product as a target for a cancer therapeutic. This method involves contacting a cancerous cell expressing a candidate gene product with an anti-cancer agent, wherein the candidate gene product corresponds to a sequence selected from the group consisting of SEQ ID NOS: 1-499; and analyzing the
25 effect of the anti-cancer agent upon a biological activity of the candidate gene product and upon a cancerous phenotype of the cancerous cell; wherein modulation of the biological activity of the candidate gene product and modulation of the cancerous phenotype of the cancerous cell indicates the candidate gene product is a target for a cancer therapeutic. In certain embodiments of this method, the cancerous cell is a cancerous breast cell. In other
30 embodiments of this method, the inhibitor is an antisense oligonucleotide. In certain other embodiments of this method, the cancerous phenotype is aberrant cellular proliferation relative to a normal cell. In another embodiment of this method, the cancerous phenotype is colony formation due to loss of contact inhibition of growth.

The invention further provides a method for identifying agents that decrease biological activity of a gene product differentially expressed in a cancerous cell, the method comprising: contacting a candidate agent with a differentially expressed gene product, the differentially expressed gene product corresponding to a sequence selected from the group consisting of SEQ ID NOS: 1-499; and detecting a decrease in a biological activity of the gene product relative to a level of biological activity of the gene product in the absence of the candidate agent. In certain embodiments of this method, the detecting step is by detection of a decrease in expression of the differentially expressed gene product. In certain other embodiments of this method, the gene product is mRNA or a cDNA prepared from the mRNA gene product. In other embodiments of the invention, the gene product is a polypeptide.

The invention further provides a method of inhibiting growth of a tumor cell by modulating expression of a gene product, the gene product being encoded by a gene identified by a sequence selected from the group consisting of: SEQ ID NOS:1-499.

These and other objects, advantages, and features of the invention will become apparent to those persons skilled in the art upon reading the details of the invention as more fully described below.

BRIEF DESCRIPTION OF THE FIGURES

Fig. 1 is three panels of autoradiographs showing expression of GAK polypeptide in different cell lines.

Fig. 2 is a graph of a hydropathy plot and a table showing the hydrophobic regions of DKFZp566I133.

Fig. 3 is six panels of photographs of MDA-231 cells exposed to C180-7, C180-8 and positive control antisense (AS) and control (RC) oligonucleotides.

Fig. 4 is an alignment of spot ID 22793 and spot ID 26883.

Fig. 5 is a figure of three sequence alignments showing the mapping of each of three sequences onto VMP1 (DKFZ).

DETAILED DESCRIPTION OF THE INVENTION

The present invention provides polynucleotides, as well as polypeptides encoded thereby, that are differentially expressed in breast cancer cells. Methods are provided in which these polynucleotides and polypeptides are used for detecting and reducing the growth of breast cancer cells. Also provided are methods in which the polynucleotides and polypeptides of the invention are used in a variety of diagnostic and therapeutic applications for breast cancer.

Before the present invention is described, it is to be understood that this invention is not limited to particular embodiments described, as such may, of course, vary. It is also to be understood that the terminology used herein is for the purpose of describing particular embodiments only, and is not intended to be limiting.

Unless defined otherwise, all technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to which this invention belongs. Although any methods and materials similar or equivalent to those described herein can be used in the practice or testing of the present invention, the preferred methods and materials are now described. All publications and patent applications mentioned herein are incorporated herein by reference to disclose and describe the methods and/or materials in connection with which the publications are cited.

It must be noted that as used herein and in the appended claims, the singular forms "a", "and", and "the" include plural referents unless the context clearly dictates otherwise. Thus, for example, reference to "a polynucleotide" includes a plurality of such polynucleotides and reference to "the breast cancer cell" includes reference to one or more cells and equivalents thereof known to those skilled in the art, and so forth.

The publications and applications discussed herein are provided solely for their disclosure prior to the filing date of the present application. Nothing herein is to be construed as an admission that the present invention is not entitled to antedate such publication by virtue of prior invention. Further, the dates of publication provided may be different from the actual publication dates which may need to be independently confirmed.

Definitions

The terms "polynucleotide" and "nucleic acid", used interchangeably herein, refer to polymeric forms of nucleotides of any length, either ribonucleotides or deoxynucleotides. Thus, these terms include, but are not limited to, single-, double-, or multi-stranded DNA or RNA, genomic DNA, cDNA, DNA-RNA hybrids, or a polymer comprising purine and

pyrimidine bases or other natural, chemically or biochemically modified, non-natural, or derivatized nucleotide bases. These terms further include, but are not limited to, mRNA or cDNA that comprise intronic sequences (see, *e.g.*, Niwa *et al.* (1999) *Cell* 99(7):691-702).

The backbone of the polynucleotide can comprise sugars and phosphate groups (as may typically be found in RNA or DNA), or modified or substituted sugar or phosphate groups. Alternatively, the backbone of the polynucleotide can comprise a polymer of synthetic subunits such as phosphoramidites and thus can be an oligodeoxynucleoside

phosphoramidate or a mixed phosphoramidate-phosphodiester oligomer. Peyrottes *et al.* (1996) *Nucl. Acids Res.* 24:1841-1848; Chaturvedi *et al.* (1996) *Nucl. Acids Res.* 24:2318-

2323. A polynucleotide may comprise modified nucleotides, such as methylated nucleotides and nucleotide analogs, uracyl, other sugars, and linking groups such as fluororibose and thioate, and nucleotide branches. The sequence of nucleotides may be interrupted by non-nucleotide components. A polynucleotide may be further modified after polymerization, such as by conjugation with a labeling component. Other types of modifications included in this definition are caps, substitution of one or more of the naturally occurring nucleotides with an analog, and introduction of means for attaching the polynucleotide to proteins, metal ions, labeling components, other polynucleotides, or a solid support. The term "polynucleotide" also encompasses peptidic nucleic acids (Pooga *et al.* *Curr Cancer Drug Targets.* (2001) 1:231-9).

A "gene product" is a biopolymeric product that is expressed or produced by a gene. A gene product may be, for example, an unspliced RNA, an mRNA, a splice variant mRNA, a polypeptide, a post-translationally modified polypeptide, a splice variant polypeptide etc. Also encompassed by this term is biopolymeric products that are made using an RNA gene product as a template (*i.e.*, cDNA of the RNA). A gene product may be made enzymatically, recombinantly, chemically, or within a cell to which the gene is native. In many embodiments, if the gene product is proteinaceous, it exhibits a biological activity. In many embodiments, if the gene product is a nucleic acid, it can be translated into a proteinaceous gene product that exhibits a biological activity.

A composition (*e.g.* a polynucleotide, polypeptide, antibody, or host cell) that is "isolated" or "in substantially isolated form" refers to a composition that is in an environment different from that in which the composition naturally occurs. For example, a polynucleotide that is in substantially isolated form is outside of the host cell in which the polynucleotide naturally occurs, and could be a purified fragment of DNA, could be part of a heterologous vector, or could be contained within a host cell that is not a host cell from

which the polynucleotide naturally occurs. The term "isolated" does not refer to a genomic or cDNA library, whole cell total protein or mRNA preparation, genomic DNA preparation, or an isolated human chromosome. A composition which is in substantially isolated form is usually substantially purified.

5 As used herein, the term "substantially purified" refers to a compound (*e.g.*, a polynucleotide, a polypeptide or an antibody, etc.) that is removed from its natural environment and is usually at least 60% free, preferably 75% free, and most preferably 90% free from other components with which it is naturally associated. Thus, for example, a composition containing A is "substantially free of" B when at least 85% by weight of the
10 total A+B in the composition is A. Preferably, A comprises at least about 90% by weight of the total of A+B in the composition, more preferably at least about 95% or even 99% by weight. In the case of polynucleotides, "A" and "B" may be two different genes positioned on different chromosomes or adjacently on the same chromosome, or two isolated cDNA species, for example.

15 The terms "polypeptide" and "protein", interchangeably used herein, refer to a polymeric form of amino acids of any length, which can include coded and non-coded amino acids, chemically or biochemically modified or derivatized amino acids, and polypeptides having modified peptide backbones. The term includes fusion proteins, including, but not limited to, fusion proteins with a heterologous amino acid sequence, fusions with
20 heterologous and homologous leader sequences, with or without N-terminal methionine residues; immunologically tagged proteins; and the like.

"Heterologous" refers to materials that are derived from different sources (*e.g.*, from different genes, different species, etc.).

 As used herein, the terms "a gene that is differentially expressed in a breast cancer cell," and "a polynucleotide that is differentially expressed in a breast cancer cell" are used
25 interchangeably herein, and generally refer to a polynucleotide that represents or corresponds to a gene that is differentially expressed in a cancerous breast cell when compared with a cell of the same cell type that is not cancerous, *e.g.*, mRNA is found at levels at least about 25%, at least about 50% to about 75%, at least about 90%, at least about 1.5-fold, at least about 2-
30 fold, at least about 5-fold, at least about 10-fold, or at least about 50-fold or more, different (*e.g.*, higher or lower). The comparison can be made in tissue, for example, if one is using in situ hybridization or another assay method that allows some degree of discrimination among cell types in the tissue. The comparison may also or alternatively be made between cells removed from their tissue source.

"Differentially expressed polynucleotide" as used herein refers to a nucleic acid molecule (RNA or DNA) comprising a sequence that represents a differentially expressed gene, *e.g.*, the differentially expressed polynucleotide comprises a sequence (*e.g.*, an open reading frame encoding a gene product; a non-coding sequence) that uniquely identifies a differentially expressed gene so that detection of the differentially expressed polynucleotide in a sample is correlated with the presence of a differentially expressed gene in a sample. "Differentially expressed polynucleotides" is also meant to encompass fragments of the disclosed polynucleotides, *e.g.*, fragments retaining biological activity, as well as nucleic acids homologous, substantially similar, or substantially identical (*e.g.*, having about 90% sequence identity) to the disclosed polynucleotides.

By "cyclin G associated kinase", or "GAK" is meant any polypeptide composition that exhibits cyclin G associated kinase activity. Examples of cyclin G associated kinase include the polypeptide defined by NCBI accession number XM_003450, NM_005255, NP_005246 and NM_031030. Assays for determining whether a polypeptide has cyclin G associated kinase activity are described in Ausubel et al., eds., 1998, Current Protocols in Molecular Biology, John Wiley & Sons, NY. Variants of the human cyclin G associated kinase that retain biological activity may be produced by, *inter alia*, substituting amino acids that are in equivalent positions between two cyclin G associated kinases, such as the cyclin G associated kinases from rat and humans.

With regard to cyclin G associated kinases, further references of interest include: Kanaoka et al, FEBS Lett. 1997 Jan 27;402(1):73-80; Kimura et al, Genomics. 1997 Sep 1;44(2):179-87; Greener et al, J Biol Chem. 2000 Jan 14;275(2):1365-70; and Korolchuk et al, Traffic. 2002 Jun;3(6):428-39.

"DKFZP566I133" and "DKFZ" are used interchangeably herein to refer to a polypeptide composition that exhibits DKFZP566I133 activity. Assays for determining whether a polypeptide has DKFZP566I133 activity (*i.e.* for determining whether DKFZP566I133 may have intracytoplasmic vacuole promoting activity) are described in Dusetti et al, (Biochem Biophys Res Commun. 2002 Jan 18;290(2):641-9). Variants of the DKFZP566I133 that retain biological activity may be produced by, *inter alia*, substituting amino acids that are in equivalent positions between two DKFZP566I133, such as the DKFZP566I133 from rat and humans. DKFZ is also known as VMP1, or vacuole membrane protein 1.

Alternatively, "DKFZP566I133", or "DKFZ" refers to an amino acid sequence defined by NCBI accession number NP_112200, AAH09758, NM_138839, and

NM_030938, polynucleotides encoding the amino acid sequences set forth in these accession numbers (SEQ ID NO:512 and SEQ ID NO:513, respectively).

In addition, "DKFZP566I133", or "DKFZ" refers to the polynucleotide sequences represented by Spot ID NOS 22793, 26883 and 27450 (SEQ ID NOS: 274-275 and SEQ ID NOS: 276-277 and SEQ ID NOS:459-460, respectively). Figure 4 shows an alignment between Spot ID NOS: 22793, 26883 and VMP1 (NM_030938) (i.e. DKFZ), identifying a VMP1 or DKFZ gene product as corresponding to these spot IDs. Figure 5 depicts fragments of Spot ID NOS 22793, 26883, 27450 which align with VMP1 (SEQ ID NOS 514, 515, and 516 respectively). These fragments, or their encoded products, may also be used as a DKFZ identifying sequence.

"Corresponds to" or "represents" when used in the context of, for example, a polynucleotide or sequence that "corresponds to" or "represents" a gene means that at least a portion of a sequence of the polynucleotide is present in the gene or in the nucleic acid gene product (e.g., mRNA or cDNA). A subject nucleic acid may also be "identified" by a polynucleotide if the polynucleotide corresponds to or represents the gene. Several genes identified by the polynucleotides of the sequence listing may be found in table 1. Genes identified by a polynucleotide may have all or a portion of the identifying sequence wholly present within an exon of a genomic sequence of the gene, or different portions of the sequence of the polynucleotide may be present in different exons (e.g., such that the contiguous polynucleotide sequence is present in an mRNA, either pre- or post-splicing, that is an expression product of the gene). In some embodiments, the polynucleotide may represent or correspond to a gene that is modified in a cancerous cell relative to a normal cell. The gene in the cancerous cell may contain a deletion, insertion, substitution, or translocation relative to the polynucleotide and may have altered regulatory sequences, or may encode a splice variant gene product, for example. The gene in the cancerous cell may be modified by insertion of an endogenous retrovirus, a transposable element, or other naturally occurring or non-naturally occurring nucleic acid. In most cases, a polynucleotide corresponds to or represents a gene if the sequence of the polynucleotide is most identical to the sequence of a gene or its product (e.g. mRNA or cDNA) as compared to other genes or their products. In most embodiments, the most identical gene is determined using a sequence comparison of a polynucleotide to a database of polynucleotides (e.g. GenBank) using the BLAST program at default settings. For example, if the most similar gene in the human genome to an exemplary polynucleotide is the protein kinase C gene, the exemplary polynucleotide corresponds to protein kinase C. In most cases, the sequence of a fragment of

an exemplary polynucleotide is at least 95%, 96%, 97%, 98%, 99% or up to 100% identical to a sequence of at least 15, 20, 25, 30, 35, 40, 45, or 50 contiguous nucleotides of a corresponding gene or its product (mRNA or cDNA), when nucleotides that are "N" represent G, A, T or C.

5 An "identifying sequence" is a minimal fragment of a sequence of contiguous nucleotides that uniquely identifies or defines a polynucleotide sequence or its complement. In many embodiments, a fragment of a polynucleotide uniquely identifies or defines a polynucleotide sequence or its complement. In some embodiments, the entire contiguous sequence of a gene, cDNA, EST, or other provided sequence is an identifying sequence.

10 "Diagnosis" as used herein generally includes determination of a subject's susceptibility to a disease or disorder, determination as to whether a subject is presently affected by a disease or disorder, prognosis of a subject affected by a disease or disorder (e.g., identification of pre-metastatic or metastatic cancerous states, stages of cancer, or responsiveness of cancer to therapy), and use of therametrics (e.g., monitoring a subject's
15 condition to provide information as to the effect or efficacy of therapy).

As used herein, the term "a polypeptide associated with breast cancer" refers to a polypeptide encoded by a polynucleotide that is differentially expressed in a breast cancer cell. Several examples of polypeptides associated with breast cancer are shown in Table 1.

20 The term "biological sample" encompasses a variety of sample types obtained from an organism and can be used in a diagnostic or monitoring assay. The term encompasses blood and other liquid samples of biological origin, solid tissue samples, such as a biopsy specimen or tissue cultures or cells derived therefrom and the progeny thereof. The term encompasses samples that have been manipulated in any way after their procurement, such as by treatment with reagents, solubilization, or enrichment for certain components. The
25 term encompasses a clinical sample, and also includes cells in cell culture, cell supernatants, cell lysates, serum, plasma, biological fluids, and tissue samples.

The terms "treatment", "treating", "treat" and the like are used herein to generally refer to obtaining a desired pharmacologic and/or physiologic effect. The effect may be prophylactic in terms of completely or partially preventing a disease or symptom thereof
30 and/or may be therapeutic in terms of a partial or complete stabilization or cure for a disease and/or adverse effect attributable to the disease. "Treatment" as used herein covers any treatment of a disease in a mammal, particularly a human, and includes: (a) preventing the disease or symptom from occurring in a subject which may be predisposed to the disease or symptom but has not yet been diagnosed as having it; (b) inhibiting the disease symptom,

i.e., arresting its development; or (c) relieving the disease symptom, i.e., causing regression of the disease or symptom.

The terms "individual," "subject," "host," and "patient," used interchangeably herein and refer to any mammalian subject for whom diagnosis, treatment, or therapy is desired, particularly humans. Other subjects may include cattle, dogs, cats, guinea pigs, rabbits, rats, mice, horses, and the like.

A "host cell", as used herein, refers to a microorganism or a eukaryotic cell or cell line cultured as a unicellular entity which can be, or has been, used as a recipient for a recombinant vector or other transfer polynucleotides, and include the progeny of the original cell which has been transfected. It is understood that the progeny of a single cell may not necessarily be completely identical in morphology or in genomic or total DNA complement as the original parent, due to natural, accidental, or deliberate mutation.

The terms "cancer", "neoplasm", "tumor", and "carcinoma", are used interchangeably herein to refer to cells which exhibit relatively autonomous growth, so that they exhibit an aberrant growth phenotype characterized by a significant loss of control of cell proliferation. In general, cells of interest for detection or treatment in the present application include precancerous (e.g., benign), malignant, pre-metastatic, metastatic, and non-metastatic cells. Detection of cancerous cells is of particular interest.

The term "normal" as used in the context of "normal cell," is meant to refer to a cell of an untransformed phenotype or exhibiting a morphology of a non-transformed cell of the tissue type being examined.

"Cancerous phenotype" generally refers to any of a variety of biological phenomena that are characteristic of a cancerous cell, which phenomena can vary with the type of cancer. The cancerous phenotype is generally identified by abnormalities in, for example, cell growth or proliferation (e.g., uncontrolled growth or proliferation), regulation of the cell cycle, cell mobility, cell-cell interaction, or metastasis, etc.

"Therapeutic target" generally refers to a gene or gene product that, upon modulation of its activity (e.g., by modulation of expression, biological activity, and the like), can provide for modulation of the cancerous phenotype.

As used throughout, "modulation" is meant to refer to an increase or a decrease in the indicated phenomenon (e.g., modulation of a biological activity refers to an increase in a biological activity or a decrease in a biological activity).

POLYNUCLEOTIDE COMPOSITIONS

The present invention provides isolated polynucleotides that represent genes that are differentially expressed in breast cancer cells. The polynucleotides, as well as polypeptides encoded thereby, find use in a variety of therapeutic and diagnostic methods.

5 The scope of the invention with respect to compositions containing the isolated polynucleotides useful in the methods described herein includes, but is not necessarily limited to, polynucleotides having a sequence set forth in any one of the polynucleotide sequences provided herein; polynucleotides obtained from the biological materials described herein or other biological sources (particularly human sources) by hybridization under
10 stringent conditions (particularly conditions of high stringency); genes corresponding to the provided polynucleotides; cDNAs corresponding to the provided polynucleotides; variants of the provided polynucleotides and their corresponding genes, particularly those variants that retain a biological activity of the encoded gene product (e.g., a biological activity ascribed to a gene product corresponding to the provided polynucleotides as a result of the assignment
15 of the gene product to a protein family(ies) and/or identification of a functional domain present in the gene product). Other nucleic acid compositions contemplated by and within the scope of the present invention will be readily apparent to one of ordinary skill in the art when provided with the disclosure here. "Polynucleotide" and "nucleic acid" as used herein with reference to nucleic acids of the composition is not intended to be limiting as to the
20 length or structure of the nucleic acid unless specifically indicated.

The invention features polynucleotides that represent genes that are expressed in human tissue, specifically human breast tissue, particularly polynucleotides that are differentially expressed in cancerous breast cells. Nucleic acid compositions described herein of particular interest are at least about 15 bp in length, at least about 30 bp in length,
25 at least about 50 bp in length, at least about 100 bp, at least about 200 bp in length, at least about 300 bp in length, at least about 500 bp in length, at least about 800 bp in length, at least about 1 kb in length, at least about 2.0 kb in length, at least about 3.0 kb in length, at least about 5 kb in length, at least about 10 kb in length, at least about 50kb in length and are usually less than about 200 kb in length. These polynucleotides (or polynucleotide
30 fragments) have uses that include, but are not limited to, diagnostic probes and primers as starting materials for probes and primers, as discussed herein.

The subject polynucleotides usually comprise a sequence set forth in any one of the polynucleotide sequences provided herein, for example, in the sequence listing, incorporated by reference in a table (e.g. by an NCBI accession number), a cDNA deposited at the

A.T.C.C., or a fragment or variant thereof. A "fragment" or "portion" of a polynucleotide is a contiguous sequence of residues at least about 10 nt to about 12 nt, 15 nt, 16 nt, 18 nt or 20 nt in length, usually at least about 22 nt, 24 nt, 25 nt, 30 nt, 40 nt, 50 nt, 60nt, 70 nt, 80 nt, 90 nt, 100 nt to at least about 150 nt, 200 nt, 250 nt, 300 nt, 350 nt, 400 nt, 500 nt, 800 nt or up to about 1000 nt, 1500 or 2000 nt in length. In some embodiments, a fragment of a polynucleotide is the coding sequence of a polynucleotide. A fragment of a polynucleotide may start at position 1 (i.e. the first nucleotide) of a nucleotide sequence provided herein, or may start at about position 10, 20, 30, 50, 75, 100, 150, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 900, 1000, 1500 or 2000, or an ATG translational initiation codon of a nucleotide sequence provided herein. In this context "about" includes the particularly recited value or a value larger or smaller by several (5, 4, 3, 2, or 1) nucleotides. The described polynucleotides and fragments thereof find use as hybridization probes, PCR primers, BLAST probes, or as an identifying sequence, for example.

The subject nucleic acids may be variants or degenerate variants of a sequence provided herein. In general, a variants of a polynucleotide provided herein have a fragment of sequence identity that is greater than at least about 65%, greater than at least about 70%, greater than at least about 75%, greater than at least about 80%, greater than at least about 85%, or greater than at least about 90%, 95%, 96%, 97%, 98%, 99% or more (i.e. 100%) as compared to an identically sized fragment of a provided sequence. as determined by the Smith-Waterman homology search algorithm as implemented in MPSRCH program (Oxford Molecular). For the purposes of this invention, a preferred method of calculating percent identity is the Smith-Waterman algorithm. Global DNA sequence identity should be greater than 65% as determined by the Smith-Waterman homology search algorithm as implemented in MPSRCH program (Oxford Molecular) using an gap search with the following search parameters: gap open penalty, 12; and gap extension penalty, 1.

The subject nucleic acid compositions include full-length cDNAs or mRNAs that encompass an identifying sequence of contiguous nucleotides from any one of the polynucleotide sequences provided herein.

As discussed above, the polynucleotides useful in the methods described herein also include polynucleotide variants having sequence similarity or sequence identity. Nucleic acids having sequence similarity are detected by hybridization under low stringency conditions, for example, at 50°C and 10XSSC (0.9 M saline/0.09 M sodium citrate) and remain bound when subjected to washing at 55°C in 1XSSC. Sequence identity can be determined by hybridization under high stringency conditions, for example, at 50°C or

higher and 0.1XSSC (9 mM saline/0.9 mM sodium citrate). Hybridization methods and conditions are well known in the art, see, *e.g.*, USPN 5,707,829. Nucleic acids that are substantially identical to the provided polynucleotide sequences, *e.g.* allelic variants, genetically altered versions of the gene, *etc.*, bind to the provided polynucleotide sequences
5 under stringent hybridization conditions. By using probes, particularly labeled probes of DNA sequences, one can isolate homologous or related genes. The source of homologous genes can be any species, *e.g.* primate species, particularly human; rodents, such as rats and mice; canines, felines, bovines, ovines, equines, yeast, nematodes, *etc.*

In one embodiment, hybridization is performed using a fragment of at least 15
10 contiguous nucleotides (nt) of at least one of the polynucleotide sequences provided herein. That is, when at least 15 contiguous nt of one of the disclosed polynucleotide sequences is used as a probe, the probe will preferentially hybridize with a nucleic acid comprising the complementary sequence, allowing the identification and retrieval of the nucleic acids that uniquely hybridize to the selected probe. Probes from more than one polynucleotide
15 sequence provided herein can hybridize with the same nucleic acid if the cDNA from which they were derived corresponds to one mRNA.

Polynucleotides contemplated for use in the invention also include those having a sequence of naturally occurring variants of the nucleotide sequences (*e.g.*, degenerate variants (*e.g.*, sequences that encode the same polypeptides but, due to the degenerate nature
20 of the genetic code, different in nucleotide sequence), allelic variants, *etc.*). Variants of the polynucleotides contemplated by the invention are identified by hybridization of putative variants with nucleotide sequences disclosed herein, preferably by hybridization under stringent conditions. For example, by using appropriate wash conditions, variants of the polynucleotides described herein can be identified where the allelic variant exhibits at most
25 about 25-30% base pair (bp) mismatches relative to the selected polynucleotide probe. In general, allelic variants contain 15-25% bp mismatches, and can contain as little as even 5-15%, or 2-5%, or 1-2% bp mismatches, as well as a single bp mismatch.

The invention also encompasses homologs corresponding to any one of the polynucleotide sequences provided herein, where the source of homologous genes can be
30 any mammalian species, *e.g.*, primate species, particularly human; rodents, such as rats; canines, felines, bovines, ovines, equines, yeast, nematodes, *etc.* Between mammalian species, *e.g.*, human and mouse, homologs generally have substantial sequence similarity, *e.g.*, at least 75% sequence identity, usually at least 80%, at least 85, at least 90%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99% or even 100% identity between

nucleotide sequences. Sequence similarity is calculated based on a reference sequence, which may be a subset of a larger sequence, such as a conserved motif, coding region, flanking region, *etc.* A reference sequence will usually be at least about a fragment of a polynucleotide sequence and may extend to the complete sequence that is being compared.

- 5 Algorithms for sequence analysis are known in the art, such as gapped BLAST, described in Altschul, et al. *Nucleic Acids Res.* (1997) 25:3389-3402, or TeraBLAST available from TimeLogic Corp. (Crystal Bay, Nevada).

Moreover, representative examples of polynucleotide fragments of the invention (useful, for example, as probes), include, for example, fragments comprising, or alternatively
10 consisting of, a sequence from about nucleotide number 1-50, 51-100, 101-150, 151-200, 201-250, 251-300, 301-350, 351-400, 401-450, 451-500, 501-550, 551-600, 651-700, 701-750, 751-800, 800-850, 851-900, 901-950, 951-1000, 1001-1050, 1051-1100, 1101-1150, 1151-1200, 1201-1250, 1251-1300, 1301-1350, 1351-1400, 1401-1450, 1451-1500, 1501-1550, 1551-1600, 1601-1650, 1651-1700, 1701-1750, 1751-1800, 1801-1850, 1851-1900,
15 1901-1950, 1951-2000, 2001-2050, 2051-2100, 2101-2150, 2151-2200, 2201-2250, 2251-2300, 2301-2350, 2351-2400, 2401-2450, 2451-2500, 2501-2550, 2551-2600, 2601-2650, 2651-2700, 2701-2750, 2751-2800, 2801-2850, 2851-2900, 2901-2950, 2951-3000, 3001-3050, 3051-3100, 3101-3150, 3151-3200, 3201-3250, 3251-3300, 3301-3350, 3351-3400, 3401-3450, 3451-3500, 3501-3550, 3551-3600, 3601-3650, 3651-3700, 3701-3750, 3751-3800, 3801-3850, 3851-3900, 3901-3950, 3951-4000, 4001-4050, 4051-4100, 4101-4150,
20 4151-4200, 4201-4250, 4251-4300, 4301-4350, 4351-4400, 4401-4450, 4451-4500, 4501-4550, 4551-4600, 4601-4650, 4651-4700, 4701-4750, 4751-4800, 4801-4850, 4851-4900, 4901-4950, 4951-5000, 5001-5050, 5051-5100, 5101-5150, 5151-5200, 5201-5250, 5251-5300, 5301-5350, 5351-5400, 5401-5450, 5451-5500, 5501-5550, 5551-5600, 5601-5650,
25 5651-5700, 5701-5750, 5751-5800, 5801-5850, 5851-5900, 5901-5950, 5951-6000, 6001-6050, 6051-6100, 6101-6150, and 6151 of a subject nucleic acid, or the complementary strand thereto. In this context "about" includes the particularly recited range or a range larger or smaller by several (5, 4, 3, 2, or 1) nucleotides, at either terminus or at both termini. In some embodiments, these fragments encode a polypeptide which has a functional activity
30 (e.g., biological activity) whereas in other embodiments, these fragments are probes, or starting materials for probes. Polynucleotides which hybridize to one or more of these nucleic acid molecules under stringent hybridization conditions or alternatively, under lower stringency conditions, are also encompassed by the invention, as are polypeptides encoded by these polynucleotides or fragments.

The subject nucleic acids can be cDNAs or genomic DNAs, as well as fragments thereof, particularly fragments that encode a biologically active gene product and/or are useful in the methods disclosed herein (e.g., in diagnosis, as a unique identifier of a differentially expressed gene of interest, etc.). The term "cDNA" as used herein is intended to include all nucleic acids that share the arrangement of sequence elements found in native mature mRNA species, where sequence elements are exons and 3' and 5' non-coding regions. Normally mRNA species have contiguous exons, with the intervening introns, when present, being removed by nuclear RNA splicing, to create a continuous open reading frame encoding a polypeptide. mRNA species can also exist with both exons and introns, where the introns may be removed by alternative splicing. Furthermore it should be noted that different species of mRNAs encoded by the same genomic sequence can exist at varying levels in a cell, and detection of these various levels of mRNA species can be indicative of differential expression of the encoded gene product in the cell.

A genomic sequence of interest comprises the nucleic acid present between the initiation codon and the stop codon, as defined in the listed sequences, including all of the introns that are normally present in a native chromosome. It can further include the 3' and 5' untranslated regions found in the mature mRNA. It can further include specific transcriptional and translational regulatory sequences, such as promoters, enhancers, *etc.*, including about 1 kb, but possibly more, of flanking genomic DNA at either the 5' and 3' end of the transcribed region. The genomic DNA can be isolated as a fragment of 100 kbp or smaller; and substantially free of flanking chromosomal sequence. The genomic DNA flanking the coding region, either 3' and 5', or internal regulatory sequences as sometimes found in introns, contains sequences required for proper tissue, stage-specific, or disease-state specific expression.

The nucleic acid compositions of the subject invention can encode all or a part of the naturally-occurring polypeptides. Double or single stranded fragments can be obtained from the DNA sequence by chemically synthesizing oligonucleotides in accordance with conventional methods, by restriction enzyme digestion, by PCR amplification, *etc.*

Probes specific to the polynucleotides described herein can be generated using the polynucleotide sequences disclosed herein. The probes are usually a fragment of a polynucleotide sequences provided herein. The probes can be synthesized chemically or can be generated from longer polynucleotides using restriction enzymes. The probes can be labeled, for example, with a radioactive, biotinylated, or fluorescent tag. Preferably, probes are designed based upon an identifying sequence of any one of the polynucleotide sequences

provided herein. More preferably, probes are designed based on a contiguous sequence of one of the subject polynucleotides that remain unmasked following application of a masking program for masking low complexity (*e.g.*, XBLAST, RepeatMasker, etc.) to the sequence., *i.e.*, one would select an unmasked region, as indicated by the polynucleotides outside the
5 poly-n stretches of the masked sequence produced by the masking program.

The polynucleotides of interest in the subject invention are isolated and obtained in substantial purity, generally as other than an intact chromosome. Usually, the polynucleotides, either as DNA or RNA, will be obtained substantially free of other naturally-occurring nucleic acid sequences that they are usually associated with, generally
10 being at least about 50%, usually at least about 90% pure and are typically "recombinant", *e.g.*, flanked by one or more nucleotides with which it is not normally associated on a naturally occurring chromosome.

The polynucleotides described herein can be provided as a linear molecule or within a circular molecule, and can be provided within autonomously replicating molecules
15 (vectors) or within molecules without replication sequences. Expression of the polynucleotides can be regulated by their own or by other regulatory sequences known in the art. The polynucleotides can be introduced into suitable host cells using a variety of techniques available in the art, such as transferrin polycation-mediated DNA transfer, transfection with naked or encapsulated nucleic acids, liposome-mediated DNA transfer,
20 intracellular transportation of DNA-coated latex beads, protoplast fusion, viral infection, electroporation, gene gun, calcium phosphate-mediated transfection, and the like.

The nucleic acid compositions described herein can be used to, for example, produce polypeptides, as probes for the detection of mRNA in biological samples (*e.g.*, extracts of human cells) or cDNA produced from such samples, to generate additional copies of the
25 polynucleotides, to generate ribozymes or antisense oligonucleotides, and as single stranded DNA probes or as triple-strand forming oligonucleotides. The probes described herein can be used to, for example, determine the presence or absence of any one of the polynucleotide provided herein or variants thereof in a sample. These and other uses are described in more detail below.

30

POLYPEPTIDES AND VARIANTS THEREOF

The present invention further provides polypeptides encoded by polynucleotides that represent genes that are differentially expressed in breast cancer cells. Such polypeptides are referred to herein as "polypeptides associated with breast cancer." The polypeptides can be

used to generate antibodies specific for a polypeptide associated with breast cancer, which antibodies are in turn useful in diagnostic methods, prognostics methods, therametric methods, and the like as discussed in more detail herein. Polypeptides are also useful as targets for therapeutic intervention, as discussed in more detail herein.

5 The polypeptides contemplated by the invention include those encoded by the disclosed polynucleotides and the genes to which these polynucleotides correspond, as well as nucleic acids that, by virtue of the degeneracy of the genetic code, are not identical in sequence to the disclosed polynucleotides. Further polypeptides contemplated by the invention include polypeptides that are encoded by polynucleotides that hybridize to
10 polynucleotide of the sequence listing. Thus, the invention includes within its scope a polypeptide encoded by a polynucleotide having the sequence of any one of the polynucleotide sequences provided herein, or a variant thereof.

 In general, the term "polypeptide" as used herein refers to both the full length polypeptide encoded by the recited polynucleotide, the polypeptide encoded by the gene
15 represented by the recited polynucleotide, as well as portions or fragments thereof. "Polypeptides" also includes variants of the naturally occurring proteins, where such variants are homologous or substantially similar to the naturally occurring protein, and can be of an origin of the same or different species as the naturally occurring protein (*e.g.*, human, murine, or some other species that naturally expresses the recited polypeptide, usually a
20 mammalian species). In general, variant polypeptides have a sequence that has at least about 80%, usually at least about 90%, and more usually at least about 98% sequence identity with a differentially expressed polypeptide described herein, as measured by BLAST 2.0 using the parameters described above. The variant polypeptides can be naturally or non-naturally glycosylated, *i.e.*, the polypeptide has a glycosylation pattern that differs from the
25 glycosylation pattern found in the corresponding naturally occurring protein.

 The invention also encompasses homologs of the disclosed polypeptides (or fragments thereof) where the homologs are isolated from other species, *i.e.* other animal or plant species, where such homologs, usually mammalian species, *e.g.* rodents, such as mice, rats; domestic animals, *e.g.*, horse, cow, dog, cat; and humans. By "homolog" is meant a
30 polypeptide having at least about 35%, usually at least about 40% and more usually at least about 60% amino acid sequence identity to a particular differentially expressed protein as identified above, where sequence identity is determined using the BLAST 2.0 algorithm, with the parameters described *supra*.

In general, the polypeptides of interest in the subject invention are provided in a non-naturally occurring environment, e.g. are separated from their naturally occurring environment. In certain embodiments, the subject protein is present in a composition that is enriched for the protein as compared to a cell or extract of a cell that naturally produces the protein. As such, isolated polypeptide is provided, where by "isolated" or "in substantially isolated form" is meant that the protein is present in a composition that is substantially free of other polypeptides, where by substantially free is meant that less than 90%, usually less than 60% and more usually less than 50% of the composition is made up of other polypeptides of a cell that the protein is naturally found.

Also within the scope of the invention are variants; variants of polypeptides include mutants, fragments, and fusions. Mutants can include amino acid substitutions, additions or deletions. The amino acid substitutions can be conservative amino acid substitutions or substitutions to eliminate non-essential amino acids, such as to alter a glycosylation site, a phosphorylation site or an acetylation site, or to minimize misfolding by substitution or deletion of one or more cysteine residues that are not necessary for function. Conservative amino acid substitutions are those that preserve the general charge, hydrophobicity/hydrophilicity, and/or steric bulk of the amino acid substituted.

Variants can be designed so as to retain or have enhanced biological activity of a particular region of the protein (e.g., a functional domain and/or, where the polypeptide is a member of a protein family, a region associated with a consensus sequence). For example, muteins can be made which are optimized for increased antigenicity, i.e. amino acid variants of a polypeptide may be made that increase the antigenicity of the polypeptide. Selection of amino acid alterations for production of variants can be based upon the accessibility (interior vs. exterior) of the amino acid (see, e.g., Go *et al.*, *Int. J. Peptide Protein Res.* (1980) 15:211), the thermostability of the variant polypeptide (see, e.g., Querol *et al.*, *Prot. Eng.* (1996) 9:265), desired glycosylation sites (see, e.g., Olsen and Thomsen, *J. Gen. Microbiol.* (1991) 137:579), desired disulfide bridges (see, e.g., Clarke *et al.*, *Biochemistry* (1993) 32:4322; and Wakarchuk *et al.*, *Protein Eng.* (1994) 7:1379), desired metal binding sites (see, e.g., Toma *et al.*, *Biochemistry* (1991) 30:97, and Haezebrouck *et al.*, *Protein Eng.* (1993) 6:643), and desired substitutions with in proline loops (see, e.g., Masul *et al.*, *Appl. Env. Microbiol.* (1994) 60:3579). Cysteine-depleted muteins can be produced as disclosed in USPN 4,959,314. Variants also include fragments of the polypeptides disclosed herein, particularly biologically active fragments and/or fragments corresponding to functional domains. Fragments of interest will typically be at least about 10 aa to at least about 15 aa in

length, usually at least about 50 aa in length, and can be as long as 300 aa in length or longer, but will usually not exceed about 1000 aa in length, where the fragment will have a stretch of amino acids that is identical to a polypeptide encoded by a polynucleotide having a sequence of any one of the polynucleotide sequences provided herein, or a homolog thereof.

- 5 The protein variants described herein are encoded by polynucleotides that are within the scope of the invention. The genetic code can be used to select the appropriate codons to construct the corresponding variants.

A fragment of a subject polypeptide is, for example, a polypeptide having an amino acid sequence which is a portion of a subject polypeptide e.g. a polypeptide encoded by a subject polynucleotide that is identified by any one of the sequence of SEQ ID
10 NOS 1 - 499 or its complement. The polypeptide fragments of the invention are preferably at least about 9 aa, at least about 15 aa, and more preferably at least about 20 aa, still more preferably at least about 30 aa, and even more preferably, at least about 40 aa, at least about 50 aa, at least about 75 aa, at least about 100 aa, at least about 125 aa or at least about 150 aa
15 in length. A fragment "at least 20 aa in length," for example, is intended to include 20 or more contiguous amino acids from, for example, the polypeptide encoded by a cDNA, in a cDNA clone contained in a deposited library, or a nucleotide sequence shown in SEQ ID NOS:1-499 or the complementary stand thereof. In this context "about" includes the particularly recited value or a value larger or smaller by several (5, 4, 3, 2, or 1) amino acids.
20 These polypeptide fragments have uses that include, but are not limited to, production of antibodies as discussed herein. Of course, larger fragments (e.g., at least 150, 175, 200, 250, 500, 600, 1000, or 2000 amino acids in length) are also encompassed by the invention.

Moreover, representative examples of polypeptides fragments of the invention (useful in, for example, as antigens for antibody production), include, for example,
25 fragments comprising, or alternatively consisting of, a sequence from about amino acid number 1-10, 5-10, 10-20, 21-31, 31-40, 41-61, 61-81, 91-120, 121-140, 141-162, 162-200, 201-240, 241-280, 281-320, 321-360, 360-400, 400-450, 451-500, 500-600, 600-700, 700-800, 800-900 and the like. In this context "about" includes the particularly recited range or a range larger or smaller by several (5, 4, 3, 2, or 1) amino acids, at either terminus or at both
30 termini. In some embodiments, these fragments has a functional activity (e.g., biological activity) whereas in other embodiments, these fragments may be used to make an antibody.

Further polypeptide variants may are described in PCT publications WO/00-55173, WO/01-07611 and WO/02-16429

VECTORS, HOST CELLS AND PROTEIN PRODUCTION

The present invention also relates to vectors containing the polynucleotide of the present invention, host cells, and the production of polypeptides by recombinant techniques. The vector may be, for example, a phage, plasmid, viral, or retroviral vector. Retroviral
5 vectors may be replication competent or replication defective. In the latter case, viral propagation generally will occur only in complementing host cells.

The polynucleotides of the invention may be joined to a vector containing a selectable marker for propagation in a host. Generally, a plasmid vector is introduced in a precipitate, such as a calcium phosphate precipitate, or in a complex with a charged lipid. If
10 the vector is a virus, it may be packaged in vitro using an appropriate packaging cell line and then transduced into host cells.

The polynucleotide insert should be operatively linked to an appropriate promoter, such as the phage lambda PL promoter, the *E. coli* lac, trp, phoA and tac promoters, the SV40 early and late promoters and promoters of retroviral LTRs, to name a few. Other
15 suitable promoters will be known to the skilled artisan. The expression constructs will further contain sites for transcription initiation, termination, and, in the transcribed region, a ribosome binding site for translation. The coding portion of the transcripts expressed by the constructs will preferably include a translation initiating codon at the beginning and a termination codon (UAA, UGA or UAG) appropriately positioned at the end of the
20 polypeptide to be translated.

As indicated, the expression vectors will preferably include at least one selectable marker. Such markers include dihydrofolate reductase, G418 or neomycin resistance for eukaryotic cell culture and tetracycline, kanamycin or ampicillin resistance genes for culturing in *E. coli* and other bacteria.

25 Representative examples of appropriate hosts include, but are not limited to, bacterial cells, such as *E. coli*, *Streptomyces* and *Salmonella typhimurium* cells; fungal cells, such as yeast cells (e.g., *Saccharomyces cerevisiae* or *Pichia pastoris* (ATCC Accession No. 201178)); insect cells such as *Drosophila* S2 and *Spodoptera Sf9* cells; animal cells such as CHO, COS, 293, and Bowes melanoma cells; and plant cells. 5 Appropriate culture mediums
30 and conditions for the above-described host cells are known in the art.

Among vectors preferred for use in bacteria include pQE70, pQE60 and pQE-9, available from QIAGEN, Inc.; pBluescript vectors, Phagescript vectors, pNHSA, pNH16a, pNH18A, pNH46A, available from Stratagene Cloning Systems, Inc.; and ptrc99a, pKK223-3, pKK223-3, pDR540, pRITS available from Pharmacia Biotech, Inc. Among preferred

eukaryotic vectors are pWLNEO, pSV2CAT, pOG44, pXTI and pSG available from Stratagene; and pSVK3, pBPV, pMSG and pSVL available from Pharmacia. Preferred expression vectors for use in yeast systems include, but are not limited to pYES2, pYDI, pTEFI/Zeo, pYES2/GS, pPICZ, pGAPZ, pGAPZalph, pPIC9, pPIC3.5, pHIL-D2, pHIL-SI, 5 pPIC3.5K, pPIC9K, and PAO815 (all available from Invitrogen, Carload, CA). Other suitable vectors will be readily apparent to the skilled artisan.

Nucleic acids of interest may be cloned into a suitable vector by route methods. Suitable vectors include plasmids, cosmids, recombinant viral vectors e.g. retroviral vectors, YACs, BACs and the like, phage vectors.

10 Introduction of the construct into the host cell can be effected by calcium phosphate transfection, DEAE-dextran mediated transfection, cationic lipid-mediated transfection, electroporation, transduction, infection, or other methods. Such methods are described in many standard laboratory manuals, such as Davis et al., Basic Methods In Molecular Biology (1986). It is specifically contemplated that the polypeptides of the present invention 15 may in fact be expressed by a host cell lacking a recombinant vector.

A polypeptide of this invention can be recovered and purified from recombinant cell cultures by well-known methods including ammonium sulfate or ethanol precipitation, acid extraction, anion or cation exchange chromatography, phosphocellulose chromatography, hydrophobic interaction chromatography, affinity chromatography, hydroxylapatite 20 chromatography and lectin chromatography. Most preferably, high performance liquid chromatography ("HPLC") is employed for purification.

Polypeptides of the present invention can also be recovered from: products purified from natural sources, including bodily fluids, tissues and cells, whether directly isolated or cultured; products of chemical synthetic procedures; and products produced by recombinant 25 techniques from a prokaryotic or eukaryotic host, including, for example, bacterial, yeast higher plant, insect, and mammalian cells. Depending upon the host employed in a recombinant production procedure, the polypeptides of the present invention may be glycosylated or may be non-glycosylated. In addition, polypeptides of the invention may also include an initial modified methionine residue, in some cases as a result of host 30 mediated processes. Thus, it is well known in the art that the N-terminal methionine encoded by the translation initiation codon generally is removed with high efficiency from any protein after translation in all eukaryotic cells. While the N-terminal methionine on most proteins also is efficiently removed in most prokaryotes, for some proteins, this prokaryotic

removal process is inefficient, depending on the nature of the amino acid to which the N-terminal methionine is covalently linked.

Suitable methods and compositions for polypeptide expression may be found in PCT publications WO/00-55173, WO/01-07611 and WO/02-16429.

5 In addition, polypeptides of the invention can be chemically synthesized using techniques known in the art (e.g., see Creighton, 1983, *Proteins: Structures and Molecular Principles*, W.H. Freeman & Co., N.Y., and Hunkapiller et al., *Nature*, 310:105-111 (1984)). For example, a polypeptide corresponding to a fragment of a polypeptide can be synthesized by use of a peptide synthesizer. Furthermore, if desired, nonclassical amino acids or
10 chemical amino acid analogs can be introduced as a substitution or addition into the polypeptide sequence. Non-classical amino acids include, but are not limited to, to the D-isomers of the common amino acids, 2,4-diaminobutyric acid, α -amino isobutyric acid, 4-aminobutyric acid, Abu, 2-amino butyric acid, γ -Abu, ϵ -Ahx, 6-amino hexanoic acid, Aib, 2-amino isobutyric acid, 3-amino propionic acid, ornithine, norleucine, norvaline, 5
15 hydroxyproline, sarcosine, citrulline, homocitrulline, cysteic acid, t-butylglycine, t-butylalanine, phenylglycine, cyclohexylalanine, β -alanine, fluoro-amino acids, designer amino acids such as β -methyl amino acids, Ca-methyl amino acids, Na-methyl amino acids, and amino acid analogs in general. Furthermore, the amino acid can be D (dextrorotary) or L (levorotary).

20 Non-naturally occurring variants may be produced using art-known mutagenesis techniques, which include, but are not limited to oligonucleotide mediated mutagenesis, alanine scanning, PCR mutagenesis, site directed mutagenesis (see, e.g., Carter et al., *Nucl. Acids Res.* 73:4331 (1986); and Zoller et al., *Nucl. Acids Res.* 70:6487 (1982)), cassette mutagenesis (see, e.g., Wells et al., *Gene* 34:315 (1985)), restriction selection mutagenesis
25 (see, e.g., Wells et al., *Philos. Trans. R. Soc. London SerA* 377:415 (1986)).

Scanning amino acid analysis can also be employed to identify one or more amino acids along a contiguous sequence. Among the preferred scanning amino acids are relatively small neutral amino acids. Such amino acids include alanine, glycine, serine and cysteine. Alanine is typically a preferred scanning amino acid among this group because it eliminates
30 the side-chain beyond the beta-carbon and is less likely to alter the main-chain conformation of the variant. Alanine is also typically preferred because it is the most common amino acid. If alanine substituting does not yield adequate amounts of variant, an isoteric amino acid can be used.

Any cyseine reside not involved in maintaining the proper conformation of a polypeptide may also be substituted, generally with serine, to improve the oxidative stability of the molecule and prevent aberrant crosslinking. Conversely, cysteine bonds may be added to the polypeptide to improve its stability.

5 The invention additionally, encompasses polypeptides of the present invention which are differentially modified during or after translation, e.g., by glycosylation, acetylation, phosphorylation, amidation, derivatization by known protecting/blocking groups, proteolytic cleavage, linkage to an antibody molecule or other cellular ligand, etc. Any of numerous chemical modifications may be carried out by known techniques, including but not limited, 10 to specific chemical cleavage by cyanogen bromide, trypsin, chymotrypsin, papain, V8 protease, NaBH₄; acetylation, formylation, oxidation, reduction; metabolic synthesis in the presence of tunicamycin; etc.

Additional post-translational modifications encompassed by the invention include, for example, e.g., N-linked or O-linked carbohydrate chains, processing of N-terminal or C- 15 terminal ends), attachment of chemical moieties to the amino acid backbone, chemical modifications of N-linked or O-linked carbohydrate chains, and addition or deletion of an N-terminal methionine residue as a result of procaryotic host cell expression. The polypeptides may also be modified with a detectable label, such as an enzymatic, fluorescent, isotopic or affinity label to allow for detection and isolation of the protein.

20 Also provided by the invention are chemically modified derivatives of the polypeptides of the invention which may provide additional advantages such as increased solubility, stability and circulating time of the polypeptide, or decreased immunogenicity (see U.S. Patent No. 4,179,337). The chemical moieties for derivitization may be selected from water soluble polymers such as polyethylene glycol, ethylene glycol/propylene glycol 25 copolymers, carboxymethylcellulose, dextran, polyvinyl alcohol and the like. The polypeptides may be modified at random positions within the molecule, or at predetermined positions within the molecule and may include one, two, three or more attached chemical moieties.

Suitable methods and compositions for production of modified polypeptides may be 30 found in PCT publications WO/00-55173, WO/01-07611 and WO/02-16429.

ANTIBODIES AND OTHER POLYPEPTIDE OR POLYNUCLEOTIDE BINDING MOLECULES

The present invention further provides antibodies, which may be isolated antibodies, that are specific for a polypeptide encoded by a polynucleotide described herein and/or a

polypeptide of a gene that corresponds to a polynucleotide described herein. Antibodies can be provided in a composition comprising the antibody and a buffer and/or a pharmaceutically acceptable excipient. Antibodies specific for a polypeptide associated with breast cancer are useful in a variety of diagnostic and therapeutic methods, as discussed in detail herein.

Gene products, including polypeptides, mRNA (particularly mRNAs having distinct secondary and/or tertiary structures), cDNA, or complete gene, can be prepared and used for raising antibodies for experimental, diagnostic, and therapeutic purposes. Antibodies may be used to identify a gene corresponding to a polynucleotide. The polynucleotide or related cDNA is expressed as described above, and antibodies are prepared. These antibodies are specific to an epitope on the polypeptide encoded by the polynucleotide, and can precipitate or bind to the corresponding native protein in a cell or tissue preparation or in a cell-free extract of an in vitro expression system.

Antibodies

Further polypeptides of the invention relate to antibodies and T-cell antigen receptors (TCR) which immunospecifically bind a subject polypeptide, subject polypeptide fragment, or variant thereof, and/or an epitope thereof (as determined by immunoassays well known in the art for assaying specific antibody-antigen binding). Antibodies of the invention include, but are not limited to, polyclonal, monoclonal, multispecific, human, humanized or chimeric antibodies, single chain antibodies, Fab fragments, F(ab') fragments, fragments produced by a Fab expression library, anti-idiotypic (anti-Id) antibodies (including, e.g., anti-Id antibodies to antibodies of the invention), and epitope-binding fragments of any of the above. The term "antibody," as used herein, refers to immunoglobulin molecules and immunologically active portions of immunoglobulin molecules, i.e., molecules that contain an antigen binding site that immunospecifically binds an antigen. The immunoglobulin molecules of the invention can be of any type (e.g., IgG, IgE, IgM, IgD, IgA and IgY), class (e.g., IgG1, IgG2, IgG3, IgG4, IgA1 and IgA2) or subclass of immunoglobulin molecule.

Most preferably the antibodies are human antigen-binding antibody fragments of the present invention and include, but are not limited to, Fab, Fab' and F(ab')₂, Fd, single-chain Fvs (scFv), single-chain antibodies, disulfide-linked Fvs (sdFv) and fragments comprising either a V_L or V_H domain. Antigen-binding antibody fragments, including single-chain antibodies, may comprise the variable region(s) alone or in combination with the entirety or a portion of the following: hinge region, C_H1, C_H2, and C_H3 domains. Also included in the

invention are antigen-binding fragments also comprising any combination of variable region(s) with a hinge region, C_H1, C_H2, and C_H3 domains. The antibodies of the invention may be from any animal origin including birds and mammals. Preferably, the antibodies are human, murine (e.g., mouse and rat), donkey, ship rabbit, goat, guinea pig, camel, horse, or chicken.

5 As used herein, "human" antibodies include antibodies having the amino acid sequence of a human immunoglobulin and include antibodies isolated from, human immunoglobulin libraries or from animals transgenic for one or more human immunoglobulin and that do not express endogenous immunoglobulins, as described infra and, for example in, U.S. Patent No. 5,939,598 by Kucherlapati et al.

10 The antibodies of the present invention may be monospecific, bispecific, trispecific or of greater multispecificity. Multispecific antibodies may be specific for different epitopes of a polypeptide of the present invention or may be specific for both a polypeptide of the present invention as well as for a heterologous epitope, such as a heterologous polypeptide or solid support material. See, e.g., PCT publications WO 93/17715; WO 92/08802; WO 91/00360; 15 WO 92/05793; Tutt, et al., J. Immunol. 147:60-69 (1991); U.S. Patent Nos. 4,474,893; 4,714,681; 4,925,648; 5,573,920; 5,601,819; Kostelny et al., J. Immunol. 148:1547-1553 (1992).

Antibodies of the present invention may be described or specified in terms of the epitope(s) or portion(s) of a polypeptide of the present invention which they recognize or 20 specifically bind. The epitope(s) or polypeptide portion(s) may be specified as described herein, e.g., by N-terminal and C-terminal positions, or by size in contiguous amino acid residues. Antibodies which specifically bind any epitope or polypeptide of the present invention may also be excluded. Therefore, the present invention includes antibodies that specifically bind polypeptides of the present invention, and allows for the exclusion of the 25 same.

Antibodies of the present invention may also be described or specified in terms of their cross-reactivity. Antibodies that do not bind any other analog, ortholog, or homolog of a polypeptide of the present invention are included. Antibodies that bind polypeptides with at least 95%, at least 90%, at least 85%, at least 80%, at least 75%, at least 70%, at least 65%, at 30 least 60%, at least 55%, and at least 50% identity (as calculated using methods known in the art and described herein) to a polypeptide of the present invention are also included in the present invention. In specific embodiments, antibodies of the present invention cross-react with murine, rat and/or rabbit homologs of human proteins and the corresponding epitopes thereof. Antibodies that do not bind polypeptides with less than 95%, less than 90%, less than

85%, less than 80%, less than 75%, less than 70%, less than 65%, less than 60%, less than 55%, and less than 50% identity (as calculated using methods known in the art and described herein) to a polypeptide of the present invention are also included in the present invention. In a specific embodiment, the above-described cross-reactivity is with respect to any single
5 specific antigenic or immunogenic polypeptide, or combination(s) of 2, 3, 4, 5, or more of the specific antigenic and/or immunogenic polypeptides disclosed herein. Further included in the present invention are antibodies which bind polypeptides encoded by polynucleotides which hybridize to a polynucleotide of the present invention under stringent hybridization conditions (as described herein). Antibodies of the present invention may also be described or
10 specified in terms of their binding affinity to a polypeptide of the invention. Preferred binding affinities include those with a dissociation constant or K_d less than 5×10^{-2} M, 10^{-2} M, 5×10^{-3} M, 10^{-3} M, 5×10^{-4} M, 10^{-4} M, 5×10^{-5} M, 10^{-5} M, 5×10^{-6} M, 10^{-6} M, 5×10^{-7} M, 10^{-7} M, 5×10^{-8} M, 10^{-8} M, 5×10^{-9} M, 10^{-9} M, 5×10^{-10} M, 10^{-10} M, 5×10^{-11} M, 10^{-11} M, 5×10^{-12} M, 10^{-12} M, 5×10^{-13} M, 10^{-13} M, 5×10^{-14} M, 10^{-14} M, 5×10^{-15} M, or 10^{-15} M.

15 The invention also provides antibodies that competitively inhibit binding of an antibody to an epitope of the invention as determined by any method known in the art for determining competitive binding, for example, the immunoassays described herein. In preferred embodiments, the antibody competitively inhibits binding to the epitope by at least 95%, at least 90%, at least 85 %, at least 80%, at least 75%, at least 70%, at least 60%, or at
20 least 50%.

Methods for making screening, humanizing, and modifying different types of antibody are well known in the art and may be found in PCT publications WO/00-55173, WO/01-07611 and WO/02-16429.

25 Antibodies of the present invention may act as agonists or antagonists of the polypeptides of the present invention. For example, the present invention includes antibodies which disrupt the receptor/ligand interactions with the polypeptides of the invention either partially or fully. Preferably, antibodies of the present invention bind an antigenic epitope disclosed herein, or a portion thereof. The invention features both receptor-specific antibodies and ligand-specific antibodies. The invention also features receptor-specific antibodies which do not
30 prevent ligand binding but prevent receptor activation. Receptor activation (i.e., signaling) may be determined by techniques described herein or otherwise known in the art. For example, receptor activation can be determined by detecting the phosphorylation (e.g., tyrosine or serine/threonine) of the receptor or its substrate by immunoprecipitation followed by western blot analysis (for example, as described supra). In specific embodiments, antibodies are provided

that inhibit ligand activity or receptor activity by at least 95%, at least 90%, at least 85%, at least 80%, at least 75%, at least 70%, at least 60%, or at least 50% of the activity in absence of the antibody.

The invention also features receptor-specific antibodies which both prevent ligand binding and receptor activation as well as antibodies that recognize the receptor-ligand complex, and, preferably, do not specifically recognize the unbound receptor or the unbound ligand. Likewise, included in the invention are neutralizing antibodies which bind the ligand and prevent binding of the ligand to the receptor, as well as antibodies which bind the ligand, thereby preventing receptor activation, but do not prevent the ligand from binding the receptor.

Further included in the invention are antibodies which activate the receptor. These antibodies may act as receptor agonists, i.e., potentiate or activate either all or a subset of the biological activities of the ligand-mediated receptor activation, for example, by inducing dimerization of the receptor. The antibodies may be specified as agonists, antagonists or inverse agonists for biological activities comprising the specific biological activities of the peptides of the invention disclosed herein. The above antibody agonists can be made using methods known in the art. See, e.g., PCT publication WO 96/40281; U.S. Patent No. 5,811,097; Deng et al., Blood 92(6): 1981-1988 (1998); Chen et al., Cancer Res. 58(16):3668-4998 (1998); Harrop et al., J. Immunol. 161(4): 1786-1794 (1998); Zhu et al., Cancer Res. 58(15):3209-3214 (1998); Yoon et al., J. Immunol. 160(7):3170-3179 (1998); Prat et al., J. Cell. Sci. 111(Pt2):237-247 (1998); Pitard et al., J. Immunol. Methods 205(2): 177-190 (1997); Liautard et al., Cytokine 9(4):233-241 (1997); Carlson et al., J. Biol. Chem. 272(17): 11295-11301 (1997); Taryman et al., Neuron 14(4):755-762 (1995); Muller et al., Structure 6(9): 1153-1167 (1998); Bartunek et al., Cytokine 8(1):14-20 (1996) (which are all incorporated by reference herein in their entireties).

Antibodies of the present invention may be used, for example, but not limited to, to purify, detect, and target the polypeptides of the present invention, including both in vitro and in vivo diagnostic and therapeutic methods. For example, the antibodies have use in immunoassays for qualitatively and quantitatively measuring levels of the polypeptides of the present invention in biological samples. See, e.g., Harlow et al., Antibodies: A Laboratory Manual, (Cold Spring Harbor Laboratory Press, 2nd ed. 1988) (incorporated by reference herein in its entirety).

Further methods and compositions involving antibodies may be found in PCT publications WO/00-55173, WO/01-07611 and WO/02-16429.

Polynucleotides Encoding Antibodies

The invention further provides polynucleotides comprising a nucleotide sequence encoding an antibody of the invention and fragments thereof. The invention also

encompasses polynucleotides that hybridize under stringent or alternatively, under lower stringency hybridization conditions, e.g., as defined supra, to polynucleotides that encode an antibody, preferably, that specifically binds to a polypeptide of the invention, preferably, an antibody that binds to a subject polypeptide.

5 The polynucleotides may be obtained, and the nucleotide sequence of the polynucleotides determined, by any method known in the art. For example, if the nucleotide sequence of the antibody is known, a polynucleotide encoding the antibody may be assembled from chemically synthesized oligonucleotides (e.g., as described in Kutmeier et al., BioTechniques 17:242 (1994)). which, briefly, involves the synthesis of overlapping
10 oligonucleotides containing portions of the sequence encoding the antibody, annealing and ligating of those oligonucleotides, and then amplification of the ligated oligonucleotides by PCR.

 Alternatively, a polynucleotide encoding an antibody may be generated from nucleic acid from a suitable source. If a clone containing a nucleic acid encoding a particular antibody is not available, but the sequence of the antibody molecule is known, a nucleic acid encoding the
15 immunoglobulin may be chemically synthesized or obtained from a suitable source (e.g., an antibody cDNA library, or a cDNA library generated from, or nucleic acid, preferably poly A+ RNA, isolated from, any tissue or cells expressing the antibody, such as hybridoma cells selected to express an antibody of the invention) by PCR amplification using synthetic primers hybridizable to the 3' and 5' ends of the sequence or by cloning using an oligonucleotide probe
20 specific for the particular gene sequence to identify, e.g., a cDNA clone from a cDNA library that encodes the antibody. Amplified nucleic acids generated by PCR may then be cloned into replicable cloning vectors using any method well known in the art.

 Once the nucleotide sequence and corresponding amino acid sequence of the antibody is determined, the nucleotide sequence of the antibody may be manipulated using methods well
25 known in the art for the manipulation of nucleotide sequences, e.g., recombinant DNA techniques, site directed mutagenesis, PCR, etc. (see, for example, the techniques described in Sambrook et al., 1990, Molecular Cloning, A Laboratory Manual, 2d Ed., Cold Spring Harbor Laboratory, Cold Spring Harbor, NY and Ausubel et al., eds., 1998, Current Protocols in Molecular Biology, John Wiley & Sons, NY, which are both incorporated by reference herein in their entireties), to
30 generate antibodies having a different amino acid sequence, for example to create amino acid substitutions, deletions, and/or insertions.

Methods of Producing Antibodies

 The antibodies of the invention can be produced by any method known in the art for the synthesis of antibodies, in particular, by chemical synthesis or preferably, by recombinant

expression techniques. Recombinant expression of an antibody of the invention, or fragment, derivative or analog thereof, (e.g., a heavy or light chain of an antibody of the invention or a single chain antibody of the invention), requires construction of an expression vector containing a polynucleotide that encodes the antibody. Once a polynucleotide encoding an antibody molecule or a heavy or light chain of an antibody, or portion thereof (preferably containing the heavy or light chain variable domain), of the invention has been obtained, the vector for the production of the antibody molecule may be produced by recombinant DNA technology using techniques well known in the art. Thus, methods for preparing a protein by expressing a polynucleotide containing an antibody encoding nucleotide sequence are described herein. Methods which are well known to those skilled in the art can be used to construct expression vectors containing antibody coding sequences and appropriate transcriptional and translational control signals. These methods include, for example, in vitro recombinant DNA techniques, synthetic techniques, and in vivo genetic recombination. The invention, thus, provides replicable vectors comprising a nucleotide sequence encoding an antibody molecule of the invention, or a heavy or light chain thereof, or a heavy or light chain variable domain, operably linked to a promoter. Such vectors may include the nucleotide sequence encoding the constant region of the antibody molecule (see, e.g., PCT Publication WO 86/05807; PCT Publication WO 89/01036; and U.S. Patent No. 5,122,464) and the variable domain of the antibody may be cloned into such a vector for expression of the entire heavy or light chain.

The expression vector is transferred to a host cell by conventional techniques and the transfected cells are then cultured by conventional techniques to produce an antibody of the invention. Thus, the invention includes host cells containing a polynucleotide encoding an antibody of the invention, or a heavy or light chain thereof, or a single chain antibody of the invention, operably linked to a heterologous promoter. In preferred embodiments for the expression of double-chained antibodies, vectors encoding both the heavy and light chains may be co-expressed in the host cell for expression of the entire immunoglobulin molecule, as detailed below.

A variety of host-expression vector systems may be utilized to express the antibody molecules of the invention. Such host-expression systems represent vehicles by which the coding sequences of interest may be produced and subsequently purified, but also represent cells which may, when transformed or transfected with the appropriate nucleotide coding sequences, express an antibody molecule of the invention in situ. These include but are not limited to microorganisms such as bacteria (e.g., *E. coli*, *B. subtilis*) transformed with recombinant bacteriophage DNA, plasmid DNA or cosmid DNA expression vectors containing antibody

coding sequences; yeast (e.g., *Saccharomyces*, *Pichia*) transformed with recombinant yeast expression vectors containing antibody coding sequences; insect cell systems infected with recombinant virus expression vectors (e.g., baculovirus) containing antibody coding sequences; plant cell systems infected with recombinant virus expression vectors (e.g., cauliflower mosaic virus, CaMV; tobacco mosaic virus, TMV) or transformed with recombinant plasmid expression vectors (e.g., Ti plasmid) containing antibody coding sequences; or mammalian cell systems (e.g., COS, CHO, BHK, 293, 3T3 cells) harboring recombinant expression constructs containing promoters derived from the genome of mammalian cells (e.g., metallothionein promoter) or from mammalian viruses (e.g., the adenovirus late promoter; the vaccinia virus 7.5K promoter). Preferably, bacterial cells such as *Escherichia coli*, and more preferably, eukaryotic cells, especially for the expression of whole recombinant antibody molecule, are used for the expression of a recombinant antibody molecule. For example, mammalian cells such as Chinese hamster ovary cells (CHO), in conjunction with a vector such as the major intermediate early gene promoter element from human cytomegalovirus is an effective expression system for antibodies (Foecking et al., Gene 45:101 (1986); Cockett et al., Bio/Technology 8:2 (1990)).

In bacterial systems, a number of expression vectors may be advantageously selected depending upon the use intended for the antibody molecule being expressed. For example, when a large quantity of such a protein is to be produced, for the generation of pharmaceutical compositions of an antibody molecule, vectors which direct the expression of high levels of fusion protein products that are readily purified may be desirable. Such vectors include, but are not limited, to the *E. coli* expression vector pUR278 (Ruther et al., EMBO J. 2:1791 (1983)), in which the antibody coding sequence may be ligated individually into the vector in frame with the lac Z coding region so that a fusion protein is produced; pIN vectors (Inouye & Inouye, Nucleic Acids Res. 13:3101-3109 (1985); Van Heeke & Schuster, J. Biol. Chem. 24:5503-5509 (1989)); and the like. pGEX vectors may also be used to express foreign polypeptides as fusion proteins with glutathione S-transferase (GST). In general, such fusion proteins are soluble and can easily be purified from lysed cells by adsorption and binding to matrix glutathione-agarose beads followed by elution in the presence of free glutathione. The pGEX vectors are designed to include thrombin or factor Xa protease cleavage sites so that the cloned target gene product can be released from the GST moiety.

In an insect system, *Autographa californica* nuclear polyhedrosis virus (AcNPV) is used as a vector to express foreign genes. The virus grows in *Spodoptera frugiperda* cells. The antibody coding sequence may be cloned individually into non-essential regions (for

example the polyhedrin gene) of the virus and placed under control of an AcNPV promoter (for example the polyhedrin promoter).

In mammalian host cells, a number of viral-based expression systems may be utilized. In cases where an adenovirus is used as an expression vector, the antibody coding sequence of interest may be ligated to an adenovirus transcription/translation control complex, e.g., the late promoter and tripartite leader sequence. This chimeric gene may then be inserted in the adenovirus genome by in vitro or in vivo recombination. Insertion in a non-essential region of the viral genome (e.g., region E1 or E3) will result in a recombinant virus that is viable and capable of expressing the antibody molecule in infected hosts, (e.g., see Logan & Shenk, Proc. Natl. Acad. Sci. USA 81:355-359 (1984)). Specific initiation signals may also be required for efficient translation of inserted antibody coding sequences. These signals include the ATG initiation codon and adjacent sequences. Furthermore, the initiation codon must be in phase with the reading frame of the desired coding sequence to ensure translation of the entire insert. These exogenous translational control signals and initiation codons can be of a variety of origins, both natural and synthetic. The efficiency of expression may be enhanced by the inclusion of appropriate transcription enhancer elements, transcription terminators, etc. (see Bittner et al., Methods in Enzymol. 153:51-544 (1987)).

Antibodies production is well known in the art. Exemplary methods and compositions for making antibodies may be found in PCT publications WO/00-55173, WO/01-07611 and WO/02-16429.

Immunophenotyping

The antibodies of the invention may be utilized for immunophenotyping of cell lines and biological samples. The translation product of the gene of the present invention may be useful as a cell specific marker, or more specifically as a cellular marker that is differentially expressed at various stages of differentiation and/or maturation of particular cell types. Monoclonal antibodies directed against a specific epitope, or combination of epitopes, will allow for the screening of cellular populations expressing the marker. Various techniques can be utilized using monoclonal antibodies to screen for cellular populations expressing the marker(s), and include magnetic separation using antibody-coated magnetic beads, "panning" with antibody attached to a solid matrix (i.e., plate), and flow cytometry (See, e.g., U.S. Patent 5,985,660; and Morrison *et al.* Cell, 96:737-49 (1999)).

These techniques allow for the screening of particular populations of cells, such as might be found with hematological malignancies (i.e. minimal residual disease (MRD) in acute leukemic patients) and "non-self cells in transplantations to prevent Graft-versus-Host

Disease (GVHD). Alternatively, these techniques allow for the screening of hematopoietic stem and progenitor cells capable of undergoing proliferation and/or differentiation, as might be found in human umbilical cord blood.

Assays For Antibody Binding

5 The antibodies of the invention may be assayed for immunospecific binding by any method known in the art. The immunoassays which can be used include but are not limited to competitive and non-competitive assay systems using techniques such as western blots, radioimmunoassays, ELISA (enzyme linked immunosorbent assay), "sandwich" immunoassays, immunoprecipitation assays, precipitin reactions, gel diffusion precipitin
10 reactions, immunodiffusion assays, agglutination assays, complement-fixation assays, immunoradiometric assays, fluorescent immunoassays, protein A immunoassays, to name but a few. Such assays are routine and well known in the art (see, e.g., Ausubel et al, eds, 1994, Current Protocols in Molecular Biology, Vol. 1, John Wiley & Sons, Inc., New York, which is incorporated by reference herein in its entirety). Exemplary immunoassays are described briefly
15 below (but are not intended by way of limitation).

Immunoprecipitation protocols generally comprise lysing a population of cells in a lysis buffer such as R1PA buffer (1% NP-40 or Triton X- 100, 1% sodium deoxycholate, 0.1% SDS, 0.15 M NaCl, 0.01 M sodium phosphate at pH 7.2, 1% Trasylol) supplemented with protein phosphatase and/or protease inhibitors (e.g., EDTA, PMSF, aprotinin, sodium vanadate), adding
20 the antibody of interest to the cell lysate, incubating for a period of time (e.g., 1-4 hours) at 4° C, adding protein A and/or protein G sepharose beads to the cell lysate, incubating for about an hour or more at 4° C, washing the beads in lysis buffer and resuspending the beads in SDS/sample buffer. The ability of the antibody of interest to immunoprecipitate a particular antigen can be assessed by, e.g., western blot analysis. One of skill in the art would be knowledgeable as to the
25 parameters that can be modified to increase the binding of the antibody to an antigen and decrease the background (e.g., pre-clearing the cell lysate with sepharose beads). For further discussion regarding immunoprecipitation protocols see, e.g., Ausubel et al, eds, 1994, Current Protocols in Molecular Biology, Vol. 1, John Wiley & Sons, Inc., New York at 10.16.1.

Western blot analysis generally comprises preparing protein samples, electrophoresis of the
30 protein samples in a polyacrylamide gel (e.g., 8%- 20% SDS-PAGE depending on the molecular weight of the antigen), transferring the protein sample from the polyacrylamide gel to a membrane such as nitrocellulose, PVDF or nylon, blocking the membrane in blocking solution (e.g., PBS with 3% BSA or non-fat milk), washing the membrane in washing buffer (e.g., PBS-Tween 20), blocking the membrane with primary antibody (the antibody of interest) diluted in blocking

buffer, washing the membrane in washing buffer, blocking the membrane with a secondary antibody (which recognizes the primary antibody, e.g., an anti-human antibody) conjugated to an enzymatic substrate (e.g., horseradish peroxidase or alkaline phosphatase) or radioactive molecule (e.g., ^{32}P or ^{125}I) diluted in blocking buffer, washing the membrane in wash buffer, and detecting the presence of the antigen. One of skill in the art would be knowledgeable as to the parameters that can be modified to increase the signal detected and to reduce the background noise. For further discussion regarding western blot protocols see, e.g., Ausubel et al, eds, 1994, Current Protocols in Molecular Biology, Vol. 1, John Wiley & Sons, Inc., New York at 10.8.1.

ELISAs comprise preparing antigen, coating the well of a 96 well microtiter plate with the antigen, adding the antibody of interest conjugated to a detectable compound such as an enzymatic substrate (e.g., horseradish peroxidase or alkaline phosphatase) to the well and incubating for a period of time, and detecting the presence of the antigen. In ELISAs the antibody of interest does not have to be conjugated to a detectable compound; instead, a second antibody (which recognizes the antibody of interest) conjugated to a detectable compound may be added to the well. Further, instead of coating the well with the antigen, the antibody may be coated to the well. In this case, a second antibody conjugated to a detectable compound may be added following the addition of the antigen of interest to the coated well. One of skill in the art would be knowledgeable as to the parameters that can be modified to increase the signal detected as well as other variations of ELISAs known in the art. For further discussion regarding ELISAs see, e.g., Ausubel et al, eds, 1994, Current Protocols in Molecular Biology, Vol. 1, John Wiley & Sons, Inc., New York at 11.2.1.

The binding affinity of an antibody to an antigen and the off-rate of an antibody-antigen interaction can be determined by competitive binding assays. One example of a competitive binding assay is a radioimmunoassay comprising the incubation of labeled antigen (e.g., ^3H or ^{125}I) with the antibody of interest in the presence of increasing amounts of unlabeled antigen, and the detection of the antibody bound to the labeled antigen. The affinity of the antibody of interest for a particular antigen and the binding off-rates can be determined from the data by scatchard plot analysis. Competition with a second antibody can also be determined using radioimmunoassays. In this case, the antigen is incubated with antibody of interest conjugated to a labeled compound (e.g., ^3H or ^{125}I) in the presence of increasing amounts of an unlabeled second antibody.

Therapeutic Uses

The present invention is further directed to antibody-based therapies which involve administering antibodies of the invention to an animal, preferably a mammal, and most

preferably a human, patient for treating one or more of the disclosed diseases, disorders, or conditions. Therapeutic compounds of the invention include, but are not limited to, antibodies of the invention (including fragments, analogs and derivatives thereof as described herein) and nucleic acids encoding antibodies of the invention (including fragments, analogs and derivatives thereof and anti-idiotypic antibodies as described herein). The antibodies of the invention can be used to treat, inhibit or prevent diseases, disorders or conditions associated with aberrant expression and/or activity of a polypeptide of the invention, including, but not limited to, any one or more of the diseases, disorders, or conditions described herein. The treatment and/or prevention of diseases, disorders, or conditions associated with aberrant expression and/or activity of a polypeptide of the invention includes, but is not limited to, alleviating symptoms associated with those diseases, disorders or conditions. Antibodies of the invention may be provided in pharmaceutically acceptable compositions as known in the art or as described herein.

A summary of the ways in which the antibodies of the present invention may be used therapeutically includes binding polynucleotides or polypeptides of the present invention locally or systemically in the body or by direct cytotoxicity of the antibody, e.g. as mediated by complement (CDC) or by effector cells (ADCC). Some of these approaches are described in more detail below. Armed with the teachings provided herein, one of ordinary skill in the art will know how to use the antibodies of the present invention for diagnostic, monitoring or therapeutic purposes without undue experimentation.

The antibodies of this invention may be advantageously utilized in combination with other monoclonal or chimeric antibodies, or with lymphokines or hematopoietic growth factors (such as, e.g., IL-2, IL-3 and IL-7), for example, which serve to increase the number or activity of effector cells which interact with the antibodies.

The antibodies of the invention may be administered alone or in combination with other types of treatments (e.g., radiation therapy, chemotherapy, hormonal therapy, immunotherapy and anti-tumor agents). Generally, administration of products of a species origin or species reactivity (in the case of antibodies) that is the same species as that of the patient is preferred. Thus, in a preferred embodiment, human antibodies, fragments derivatives, analogs, or nucleic acids, are administered to a human patient for therapy or prophylaxis.

It is preferred to use high affinity and/or potent in vivo inhibiting and/or neutralizing antibodies against polypeptides or polynucleotides of the present invention, fragments or regions thereof, for both immunoassays directed to and therapy of disorders related to polynucleotides or polypeptides, including fragments thereof, of the present invention. Such antibodies, fragments, or regions, will preferably have an affinity for polynucleotides or

polypeptides of the invention, including fragments thereof. Preferred binding affinities include those with a dissociation constant or K_d less than 5×10^{-2} M, 10^{-2} M, 5×10^{-3} M, 10^{-3} M, 5×10^{-4} M, 10^{-4} M, 5×10^{-5} M, 10^{-5} M, 5×10^{-6} M, 10^{-6} M, 5×10^{-7} M, 10^{-7} M, 5×10^{-8} M, 10^{-8} M, 5×10^{-9} M, 10^{-9} M, 5×10^{-10} M, 10^{-10} M, 5×10^{-11} M, 10^{-11} M, 5×10^{-12} M, 10^{-12} M, 5×10^{-13} M, 10^{-13} M, 5×10^{-14} M, 10^{-14} M, 5×10^{-15} M, or 10^{-15} M.

KITS

Also provided by the subject invention are kits for practicing the subject methods, as described above. The subject kits include at least one or more of: a subject nucleic acid, isolated polypeptide or an antibody thereto. Other optional components of the kit include: restriction enzymes, control primers and plasmids; buffers, cells, carriers adjuvants etc. The nucleic acids of the kit may also have restrictions sites, multiple cloning sites, primer sites, etc to facilitate their ligation other plasmids. The various components of the kit may be present in separate containers or certain compatible components may be precombined into a single container, as desired. In many embodiments, kits with unit doses of the active agent, e.g. in oral or injectable doses, are provided. In certain embodiments, controls, such as samples from a cancerous or non-cancerous cell are provided by the invention. Further embodiments of the kit include an antibody for a subject polypeptide and a chemotherapeutic agent to be used in combination with the polypeptide as a treatment.

In addition to above-mentioned components, the subject kits typically further include instructions for using the components of the kit to practice the subject methods. The instructions for practicing the subject methods are generally recorded on a suitable recording medium. For example, the instructions may be printed on a substrate, such as paper or plastic, etc. As such, the instructions may be present in the kits as a package insert, in the labeling of the container of the kit or components thereof (i.e., associated with the packaging or subpackaging) etc. In other embodiments, the instructions are present as an electronic storage data file present on a suitable computer readable storage medium, e.g. CD-ROM, diskette, etc. In yet other embodiments, the actual instructions are not present in the kit, but means for obtaining the instructions from a remote source, e.g. via the internet, are provided. An example of this embodiment is a kit that includes a web address where the instructions can be viewed and/or from which the instructions can be downloaded. As with the instructions, this means for obtaining the instructions is recorded on a suitable substrate.

COMPUTER-RELATED EMBODIMENTS

In general, a library of polynucleotides is a collection of sequence information, which information is provided in either biochemical form (*e.g.*, as a collection of polynucleotide molecules), or in electronic form (*e.g.*, as a collection of polynucleotide sequences stored in a computer-readable form, as in a computer system and/or as part of a computer program). The sequence information of the polynucleotides can be used in a variety of ways, *e.g.*, as a resource for gene discovery, as a representation of sequences expressed in a selected cell type (*e.g.*, cell type markers), and/or as markers of a given disease or disease state. For example, in the instant case, the sequences of polynucleotides and polypeptides corresponding to genes differentially expressed in cancer, particular in breast cancer, as well as the nucleic acid and amino acid sequences of the genes themselves, can be provided in electronic form in a computer database.

In general, a disease marker is a representation of a gene product that is present in all cells affected by disease either at an increased or decreased level relative to a normal cell (*e.g.*, a cell of the same or similar type that is not substantially affected by disease). For example, a polynucleotide sequence in a library can be a polynucleotide that represents an mRNA, polypeptide, or other gene product encoded by the polynucleotide, that is either overexpressed or underexpressed in a cancerous breast cell affected by cancer relative to a normal (*i.e.*, substantially disease-free) breast cell.

The nucleotide sequence information of the library can be embodied in any suitable form, *e.g.*, electronic or biochemical forms. For example, a library of sequence information embodied in electronic form comprises an accessible computer data file (or, in biochemical form, a collection of nucleic acid molecules) that contains the representative nucleotide sequences of genes that are differentially expressed (*e.g.*, overexpressed or underexpressed) as between, for example, i) a cancerous cell and a normal cell; ii) a cancerous cell and a dysplastic cell; iii) a cancerous cell and a cell affected by a disease or condition other than cancer; iv) a metastatic cancerous cell and a normal cell and/or non-metastatic cancerous cell; v) a malignant cancerous cell and a non-malignant cancerous cell (or a normal cell) and/or vi) a dysplastic cell relative to a normal cell. Other combinations and comparisons of cells affected by various diseases or stages of disease will be readily apparent to the ordinarily skilled artisan. Biochemical embodiments of the library include a collection of nucleic acids that have the sequences of the genes in the library, where the nucleic acids can correspond to the entire gene in the library or to a fragment thereof, as described in greater detail below.

The polynucleotide libraries of the subject invention generally comprise sequence information of a plurality of polynucleotide sequences, where at least one of the polynucleotides has a sequence of any of sequence described herein. By plurality is meant at least 2, usually at least 3 and can include up to all of the sequences described herein. The length and number of polynucleotides in the library will vary with the nature of the library, *e.g.*, if the library is an oligonucleotide array, a cDNA array, a computer database of the sequence information, etc.

Where the library is an electronic library, the nucleic acid sequence information can be present in a variety of media. "Media" refers to a manufacture, other than an isolated nucleic acid molecule, that contains the sequence information of the present invention. Such a manufacture provides the genome sequence or a subset thereof in a form that can be examined by means not directly applicable to the sequence as it exists in a nucleic acid. For example, the nucleotide sequence of the present invention, *e.g.* the nucleic acid sequences of any of the polynucleotides of the sequences described herein, can be recorded on computer readable media, *e.g.* any medium that can be read and accessed directly by a computer. Such media include, but are not limited to: magnetic storage media, such as a floppy disc, a hard disc storage medium, and a magnetic tape; optical storage media such as CD-ROM; electrical storage media such as RAM and ROM; and hybrids of these categories such as magnetic/optical storage media.

One of skill in the art can readily appreciate how any of the presently known computer readable mediums can be used to create a manufacture comprising a recording of the present sequence information. "Recorded" refers to a process for storing information on computer readable medium, using any such methods as known in the art. Any convenient data storage structure can be chosen, based on the means used to access the stored information. A variety of data processor programs and formats can be used for storage, *e.g.* word processing text file, database format, *etc.* In addition to the sequence information, electronic versions of libraries comprising one or more sequence described herein can be provided in conjunction or connection with other computer-readable information and/or other types of computer-readable files (*e.g.*, searchable files, executable files, *etc.*, including, but not limited to, for example, search program software, *etc.*).

By providing the nucleotide sequence in computer readable form, the information can be accessed for a variety of purposes. Computer software to access sequence information (*e.g.* the NCBI sequence database) is publicly available. For example, the gapped BLAST (Altschul *et al.*, *Nucleic Acids Res.* (1997) 25:3389-3402) and BLAZE

(Brutlag *et al.*, *Comp. Chem.* (1993) 17:203) search algorithms on a Sybase system, or the TeraBLAST (TimeLogic, Crystal Bay, Nevada) program optionally running on a specialized computer platform available from TimeLogic, can be used to identify open reading frames (ORFs) within the genome that contain homology to ORFs from other organisms.

5 As used herein, "a computer-based system" refers to the hardware means, software means, and data storage means used to analyze the nucleotide sequence information of the present invention. The minimum hardware of the computer-based systems of the present invention comprises a central processing unit (CPU), input means, output means, and data storage means. A skilled artisan can readily appreciate that any one of the currently
10 available computer-based system are suitable for use in the present invention. The data storage means can comprise any manufacture comprising a recording of the present sequence information as described above, or a memory access means that can access such a manufacture.

"Search means" refers to one or more programs implemented on the computer-based
15 system, to compare a target sequence or target structural motif, or expression levels of a polynucleotide in a sample, with the stored sequence information. Search means can be used to identify fragments or regions of the genome that match a particular target sequence or target motif. A variety of known algorithms are publicly known and commercially available, e.g. MacPattern (EMBL), TeraBLAST (TimeLogic), BLASTN and BLASTX (NCBI). A
20 "target sequence" can be any polynucleotide or amino acid sequence of six or more contiguous nucleotides or two or more amino acids, preferably from about 10 to 100 amino acids or from about 30 to 300 nt. A variety of means for comparing nucleic acids or polypeptides may be used to compare accomplish a sequence comparison (e.g., to analyze target sequences, target motifs, or relative expression levels) with the data storage means. A
25 skilled artisan can readily recognize that any one of the publicly available homology search programs can be used to search the computer based systems of the present invention to compare of target sequences and motifs. Computer programs to analyze expression levels in a sample and in controls are also known in the art.

A "target structural motif," or "target motif," refers to any rationally selected
30 sequence or combination of sequences in which the sequence(s) are chosen based on a three-dimensional configuration that is formed upon the folding of the target motif, or on consensus sequences of regulatory or active sites. There are a variety of target motifs known in the art. Protein target motifs include, but are not limited to, enzyme active sites and signal sequences, kinase domains, receptor binding domains, SH2 domains, SH3 domains,

phosphorylation sites, protein interaction domains, transmembrane domains, etc. Nucleic acid target motifs include, but are not limited to, hairpin structures, promoter sequences and other expression elements such as binding sites for transcription factors.

A variety of structural formats for the input and output means can be used to input and output the information in the computer-based systems of the present invention. One format for an output means ranks the relative expression levels of different polynucleotides. Such presentation provides a skilled artisan with a ranking of relative expression levels to determine a gene expression profile. A gene expression profile can be generated from, for example, a cDNA library prepared from mRNA isolated from a test cell suspected of being cancerous or pre-cancerous, comparing the sequences or partial sequences of the clones against the sequences in an electronic database, where the sequences of the electronic database represent genes differentially expressed in a cancerous cell, *e.g.*, a cancerous breast cell. The number of clones having a sequence that has substantial similarity to a sequence that represents a gene differentially expressed in a cancerous cell is then determined, and the number of clones corresponding to each of such genes is determined. An increased number of clones that correspond to differentially expressed gene is present in the cDNA library of the test cell (relative to, for example, the number of clones expected in a cDNA of a normal cell) indicates that the test cell is cancerous.

As discussed above, the "library" as used herein also encompasses biochemical libraries of the polynucleotides of the sequences described herein, *e.g.*, collections of nucleic acids representing the provided polynucleotides. The biochemical libraries can take a variety of forms, *e.g.*, a solution of cDNAs, a pattern of probe nucleic acids stably associated with a surface of a solid support (*i.e.*, an array) and the like. Of particular interest are nucleic acid arrays in which one or more of the genes described herein is represented by a sequence on the array. By array is meant an article of manufacture that has at least a substrate with at least two distinct nucleic acid targets on one of its surfaces, where the number of distinct nucleic acids can be considerably higher, typically being at least 10 nt, usually at least 20 nt and often at least 25 nt. A variety of different array formats have been developed and are known to those of skill in the art. The arrays of the subject invention find use in a variety of applications, including gene expression analysis, drug screening, mutation analysis and the like, as disclosed in the above-listed exemplary patent documents.

In addition to the above nucleic acid libraries, analogous libraries of polypeptides are also provided, where the polypeptides of the library will represent at least a portion of the polypeptides encoded by a gene corresponding to a sequence described herein.

DIAGNOSTIC AND OTHER METHODS INVOLVING DETECTION OF DIFFERENTIALLY EXPRESSED GENES

The present invention provides methods of using the polynucleotides described herein in, for example, diagnosis of cancer and classification of cancer cells according to expression profiles. In specific non-limiting embodiments, the methods are useful for detecting breast cancer cells, facilitating diagnosis of cancer and the severity of a cancer (e.g., tumor grade, tumor burden, and the like) in a subject, facilitating a determination of the prognosis of a subject, and assessing the responsiveness of the subject to therapy (e.g., by providing a measure of therapeutic effect through, for example, assessing tumor burden during or following a chemotherapeutic regimen). Detection can be based on detection of a polynucleotide that is differentially expressed in a breast cancer cell, and/or detection of a polypeptide encoded by a polynucleotide that is differentially expressed in a breast cancer cell ("a polypeptide associated with breast cancer"). The detection methods of the invention can be conducted *in vitro* or *in vivo*, on isolated cells, or in whole tissues or a bodily fluid, e.g., blood, plasma, serum, urine, and the like).

In general, methods of the invention involving detection of a gene product (e.g., mRNA, cDNA generated from such mRNA, and polypeptides) involve contacting a sample with a probe specific for the gene product of interest. "Probe" as used herein in such methods is meant to refer to a molecule that specifically binds a gene product of interest (e.g., the probe binds to the target gene product with a specificity sufficient to distinguish binding to target over non-specific binding to non-target (background) molecules). "Probes" include, but are not necessarily limited to, nucleic acid probes (e.g., DNA, RNA, modified nucleic acid, and the like), antibodies (e.g., antibodies, antibody fragments that retain binding to a target epitope, single chain antibodies, and the like), or other polypeptide, peptide, or molecule (e.g., receptor ligand) that specifically binds a target gene product of interest.

The probe and sample suspected of having the gene product of interest are contacted under conditions suitable for binding of the probe to the gene product. For example, contacting is generally for a time sufficient to allow binding of the probe to the gene product (e.g., from several minutes to a few hours), and at a temperature and conditions of osmolarity and the like that provide for binding of the probe to the gene product at a level that is sufficiently distinguishable from background binding of the probe (e.g., under conditions that minimize non-specific binding). Suitable conditions for probe-target gene

product binding can be readily determined using controls and other techniques available and known to one of ordinary skill in the art.

In this embodiment, the probe can be an antibody or other polypeptide, peptide, or molecule (e.g., receptor ligand) that specifically binds a target polypeptide of interest.

5 The detection methods can be provided as part of a kit. Thus, the invention further provides kits for detecting the presence and/or a level of a polynucleotide that is differentially expressed in a breast cancer cell (e.g., by detection of an mRNA encoded by the differentially expressed gene of interest), and/or a polypeptide encoded thereby, in a biological sample. Procedures using these kits can be performed by clinical laboratories,
10 experimental laboratories, medical practitioners, or private individuals. The kits of the invention for detecting a polypeptide encoded by a polynucleotide that is differentially expressed in a breast cancer cell comprise a moiety that specifically binds the polypeptide, which may be a specific antibody. The kits of the invention for detecting a polynucleotide that is differentially expressed in a breast cancer cell comprise a moiety that specifically
15 hybridizes to such a polynucleotide. The kit may optionally provide additional components that are useful in the procedure, including, but not limited to, buffers, developing reagents, labels, reacting surfaces, means for detection, control samples, standards, instructions, and interpretive information.

20 Detecting a polypeptide encoded by a polynucleotide that is differentially expressed in a breast cancer cell

In some embodiments, methods are provided for a detecting breast cancer cell by detecting in a cell, particularly a breast cell, a polypeptide encoded by a gene differentially expressed in a breast cancer cell. Any of a variety of known methods can be used for detection, including, but not limited to, immunoassay, using an antibody specific for the
25 encoded polypeptide, e.g., by enzyme-linked immunosorbent assay (ELISA), radioimmunoassay (RIA), and the like; and functional assays for the encoded polypeptide, e.g., binding activity or enzymatic activity.

For example, an immunofluorescence assay can be easily performed on cells without first isolating the encoded polypeptide. The cells are first fixed onto a solid support, such as
30 a microscope slide or microtiter well. This fixing step can permeabilize the cell membrane. The permeabilization of the cell membrane permits the polypeptide-specific probe (e.g., antibody) to bind. Alternatively, where the polypeptide is secreted or membrane-bound, or is otherwise accessible at the cell-surface (e.g., receptors, and other molecule stably-

associated with the outer cell membrane or otherwise stably associated with the cell membrane, such permeabilization may not be necessary.

Next, the fixed cells are exposed to an antibody specific for the encoded polypeptide. To increase the sensitivity of the assay, the fixed cells may be further exposed to a second antibody, which is labeled and binds to the first antibody, which is specific for the encoded polypeptide. Typically, the secondary antibody is detectably labeled, e.g., with a fluorescent marker. The cells which express the encoded polypeptide will be fluorescently labeled and easily visualized under the microscope. See, for example, Hashido *et al.* (1992) *Biochem. Biophys. Res. Comm.* 187:1241-1248.

As will be readily apparent to the ordinarily skilled artisan upon reading the present specification, the detection methods and other methods described herein can be varied. Such variations are within the intended scope of the invention. For example, in the above detection scheme, the probe for use in detection can be immobilized on a solid support, and the test sample contacted with the immobilized probe. Binding of the test sample to the probe can then be detected in a variety of ways, e.g., by detecting a detectable label bound to the test sample.

The present invention further provides methods for detecting the presence of and/or measuring a level of a polypeptide in a biological sample, which polypeptide is encoded by a polynucleotide that represents a gene differentially expressed in cancer, particularly in a polynucleotide that represents a gene differentially cancer cell, using a probe specific for the encoded polypeptide. In this embodiment, the probe can be a an antibody or other polypeptide, peptide, or molecule (e.g., receptor ligand) that specifically binds a target polypeptide of interest.

The methods generally comprise: a) contacting the sample with an antibody specific for a differentially expressed polypeptide in a test cell; and b) detecting binding between the antibody and molecules of the sample. The level of antibody binding (either qualitative or quantitative) indicates the cancerous state of the cell. For example, where the differentially expressed gene is increased in cancerous cells, detection of an increased level of antibody binding to the test sample relative to antibody binding level associated with a normal cell indicates that the test cell is cancerous.

Suitable controls include a sample known not to contain the encoded polypeptide; and a sample contacted with an antibody not specific for the encoded polypeptide, e.g., an anti-idiotypic antibody. A variety of methods to detect specific antibody-antigen interactions are known in the art and can be used in the method, including, but not limited to, standard

immunohistological methods, immunoprecipitation, an enzyme immunoassay, and a radioimmunoassay.

In general, the specific antibody will be detectably labeled, either directly or indirectly. Direct labels include radioisotopes; enzymes whose products are detectable (e.g., luciferase, β -galactosidase, and the like); fluorescent labels (e.g., fluorescein isothiocyanate, rhodamine, phycoerythrin, and the like); fluorescence emitting metals, e.g., ^{152}Eu , or others of the lanthanide series, attached to the antibody through metal chelating groups such as EDTA; chemiluminescent compounds, e.g., luminol, isoluminol, acridinium salts, and the like; bioluminescent compounds, e.g., luciferin, aequorin (green fluorescent protein), and the like.

The antibody may be attached (coupled) to an insoluble support, such as a polystyrene plate or a bead. Indirect labels include second antibodies specific for antibodies specific for the encoded polypeptide ("first specific antibody"), wherein the second antibody is labeled as described above; and members of specific binding pairs, e.g., biotin-avidin, and the like. The biological sample may be brought into contact with and immobilized on a solid support or carrier, such as nitrocellulose, that is capable of immobilizing cells, cell particles, or soluble proteins. The support may then be washed with suitable buffers, followed by contacting with a detectably-labeled first specific antibody. Detection methods are known in the art and will be chosen as appropriate to the signal emitted by the detectable label.

Detection is generally accomplished in comparison to suitable controls, and to appropriate standards.

In some embodiments, the methods are adapted for use *in vivo*, e.g., to locate or identify sites where breast cancer cells are present. In these embodiments, a detectably-labeled moiety, e.g., an antibody, which is specific for a breast cancer-associated polypeptide is administered to an individual (e.g., by injection), and labeled cells are located using standard imaging techniques, including, but not limited to, magnetic resonance imaging, computed tomography scanning, and the like. In this manner, breast cancer cells are differentially labeled.

Detecting a polynucleotide that represents a gene differentially expressed in a breast cancer cell

In some embodiments, methods are provided for detecting a breast cancer cell by detecting expression in the cell of a transcript or that is differentially expressed in a breast cancer cell. Any of a variety of known methods can be used for detection, including, but not limited to, detection of a transcript by hybridization with a polynucleotide that hybridizes to

a polynucleotide that is differentially expressed in a breast cancer cell; detection of a transcript by a polymerase chain reaction using specific oligonucleotide primers; *in situ* hybridization of a cell using as a probe a polynucleotide that hybridizes to a gene that is differentially expressed in a breast cancer cell and the like.

5 In many embodiments, the levels of a subject gene product are measured. By measured is meant qualitatively or quantitatively estimating the level of the gene product in a first biological sample either directly (e.g. by determining or estimating absolute levels of gene product) or relatively by comparing the levels to a second control biological sample. In many embodiments the second control biological sample is obtained from an individual not
10 having not having breast cancer. As will be appreciated in the art, once a standard control level of gene expression is known, it can be used repeatedly as a standard for comparison. Other control samples include samples of cancerous breast tissue.

The methods can be used to detect and/or measure mRNA levels of a gene that is differentially expressed in a breast cancer cell. In some embodiments, the methods
15 comprise: a) contacting a sample with a polynucleotide that corresponds to a differentially expressed gene described herein under conditions that allow hybridization; and b) detecting hybridization, if any. Detection of differential hybridization, when compared to a suitable control, is an indication of the presence in the sample of a polynucleotide that is differentially expressed in a breast cancer cell. Appropriate controls include, for example, a
20 sample that is known not to contain a polynucleotide that is differentially expressed in a breast cancer cell. Conditions that allow hybridization are known in the art, and have been described in more detail above.

Detection can also be accomplished by any known method, including, but not limited to, *in situ* hybridization, PCR (polymerase chain reaction), RT-PCR (reverse transcription-
25 PCR), and "Northern" or RNA blotting, arrays, microarrays, etc, or combinations of such techniques, using a suitably labeled polynucleotide. A variety of labels and labeling methods for polynucleotides are known in the art and can be used in the assay methods of the invention. Specific hybridization can be determined by comparison to appropriate controls.

30 Polynucleotide generally comprising at least 12 contiguous nt of a polynucleotide provided herein, as shown in the Sequence Listing or of the sequences of the genes corresponding to the polynucleotides of the Sequence Listing, are used for a variety of purposes, such as probes for detection of and/or measurement of, transcription levels of a polynucleotide that is differentially expressed in a breast cancer cell. Additional disclosure

about preferred regions of the disclosed polynucleotide sequences is found in the Examples. A probe that hybridizes specifically to a polynucleotide disclosed herein should provide a detection signal at least 2-, 5-, 10-, or 20-fold higher than the background hybridization provided with other unrelated sequences. It should be noted that "probe" as used in this context of detection of nucleic acid is meant to refer to a polynucleotide sequence used to detect a differentially expressed gene product in a test sample. As will be readily appreciated by the ordinarily skilled artisan, the probe can be detectably labeled and contacted with, for example, an array comprising immobilized polynucleotides obtained from a test sample (*e.g.*, mRNA). Alternatively, the probe can be immobilized on an array and the test sample detectably labeled. These and other variations of the methods of the invention are well within the skill in the art and are within the scope of the invention.

Labeled nucleic acid probes may be used to detect expression of a gene corresponding to the provided polynucleotide. In Northern blots, mRNA is separated electrophoretically and contacted with a probe. A probe is detected as hybridizing to an mRNA species of a particular size. The amount of hybridization can be quantitated to determine relative amounts of expression, for example under a particular condition. Probes are used for *in situ* hybridization to cells to detect expression. Probes can also be used *in vivo* for diagnostic detection of hybridizing sequences. Probes are typically labeled with a radioactive isotope. Other types of detectable labels can be used such as chromophores, fluorophores, and enzymes. Other examples of nucleotide hybridization assays are described in WO92/02526 and USPN 5,124,246.

PCR is another means for detecting small amounts of target nucleic acids, methods for which may be found in Sambrook, *et al.* Molecular Cloning: A Laboratory Manual, CSH Press 1989, pp.14.2-14.33.

A detectable label may be included in the amplification reaction. Suitable detectable labels include fluorochromes, (*e.g.* fluorescein isothiocyanate (FITC), rhodamine, Texas Red, phycoerythrin, allophycocyanin, 6-carboxyfluorescein (6-FAM), 2',7'-dimethoxy-4',5'-dichloro-6-carboxyfluorescein, 6-carboxy-X-rhodamine (ROX), 6-carboxy-2',4',7',4,7-hexachlorofluorescein (HEX), 5-carboxyfluorescein (5-FAM) or N,N,N',N'-tetramethyl-6-carboxyrhodamine (TAMRA)), radioactive labels, (*e.g.* ^{32}P , ^{35}S , ^3H , *etc.*), and the like. The label may be a two stage system, where the polynucleotides is conjugated to biotin, haptens, *etc.* having a high affinity binding partner, *e.g.* avidin, specific antibodies, *etc.*, where the binding partner is conjugated to a detectable label. The label may be conjugated to one or

both of the primers. Alternatively, the pool of nucleotides used in the amplification is labeled, so as to incorporate the label into the amplification product.

Arrays

Polynucleotide arrays provide a high throughput technique that can assay a large
5 number of polynucleotides or polypeptides in a sample. This technology can be used as a tool to test for differential expression.

A variety of methods of producing arrays, as well as variations of these methods, are known in the art and contemplated for use in the invention. For example, arrays can be created by spotting polynucleotide probes onto a substrate (*e.g.*, glass, nitrocellulose, *etc.*) in
10 a two-dimensional matrix or array having bound probes. The probes can be bound to the substrate by either covalent bonds or by non-specific interactions, such as hydrophobic interactions.

Samples of polynucleotides can be detectably labeled (*e.g.*, using radioactive or fluorescent labels) and then hybridized to the probes. Double stranded polynucleotides,
15 comprising the labeled sample polynucleotides bound to probe polynucleotides, can be detected once the unbound portion of the sample is washed away. Alternatively, the polynucleotides of the test sample can be immobilized on the array, and the probes detectably labeled. Techniques for constructing arrays and methods of using these arrays are described in, for example, Schena *et al.* (1996) *Proc Natl Acad Sci U S A.* 93(20):10614-9;
20 Schena *et al.* (1995) *Science* 270(5235):467-70; Shalon *et al.* (1996) *Genome Res.* 6(7):639-45, USPN 5,807,522, EP 799 897; WO 97/29212; WO 97/27317; EP 785 280; WO 97/02357; USPN 5,593,839; USPN 5,578,832; EP 728 520; USPN 5,599,695; EP 721 016; USPN 5,556,752; WO 95/22058; and USPN 5,631,734. In most embodiments, the "probe" is detectably labeled. In other embodiments, the probe is immobilized on the array and not
25 detectably labeled.

Arrays can be used, for example, to examine differential expression of genes and can be used to determine gene function. For example, arrays can be used to detect differential expression of a gene corresponding to a polynucleotide described herein, where expression is compared between a test cell and control cell (*e.g.*, cancer cells and normal cells). For
30 example, high expression of a particular message in a cancer cell, which is not observed in a corresponding normal cell, can indicate a cancer specific gene product. Exemplary uses of arrays are further described in, for example, Pappalarado *et al.*, *Sem. Radiation Oncol.* (1998) 8:217; and Ramsay, *Nature Biotechnol.* (1998) 16:40. Furthermore, many variations on methods of detection using arrays are well within the skill in the art and within the scope

of the present invention. For example, rather than immobilizing the probe to a solid support, the test sample can be immobilized on a solid support which is then contacted with the probe.

5 DIAGNOSIS, PROGNOSIS, ASSESSMENT OF THERAPY (THERAMETRICS), AND
MANAGEMENT OF CANCER

The polynucleotides described herein, as well as their gene products and corresponding genes and gene products, are of particular interest as genetic or biochemical markers (e.g., in blood or tissues) that will detect the earliest changes along the
10 carcinogenesis pathway and/or to monitor the efficacy of various therapies and preventive interventions.

For example, the level of expression of certain polynucleotides can be indicative of a poorer prognosis, and therefore warrant more aggressive chemo- or radio-therapy for a patient or vice versa. The correlation of novel surrogate tumor specific features with
15 response to treatment and outcome in patients can define prognostic indicators that allow the design of tailored therapy based on the molecular profile of the tumor. These therapies include antibody targeting, antagonists (e.g., small molecules), and gene therapy.

Determining expression of certain polynucleotides and comparison of a patient's profile with known expression in normal tissue and variants of the disease allows a
20 determination of the best possible treatment for a patient, both in terms of specificity of treatment and in terms of comfort level of the patient. Surrogate tumor markers, such as polynucleotide expression, can also be used to better classify, and thus diagnose and treat, different forms and disease states of cancer. Two classifications widely used in oncology that can benefit from identification of the expression levels of the genes corresponding to the
25 polynucleotides described herein are staging of the cancerous disorder, and grading the nature of the cancerous tissue.

The polynucleotides that correspond to differentially expressed genes, as well as their encoded gene products, can be useful to monitor patients having or susceptible to cancer to detect potentially malignant events at a molecular level before they are detectable at a gross
30 morphological level. In addition, the polynucleotides described herein, as well as the genes corresponding to such polynucleotides, can be useful as therametrics, e.g., to assess the effectiveness of therapy by using the polynucleotides or their encoded gene products, to assess, for example, tumor burden in the patient before, during, and after therapy.

Furthermore, a polynucleotide identified as corresponding to a gene that is differentially expressed in, and thus is important for, one type of cancer can also have implications for development or risk of development of other types of cancer, e.g., where a polynucleotide represents a gene differentially expressed across various cancer types. Thus, for example, expression of a polynucleotide corresponding to a gene that has clinical implications for breast cancer can also have clinical implications for metastatic breast cancer, colon cancer, or ovarian cancer.

Staging. Staging is a process used by physicians to describe how advanced the cancerous state is in a patient. Staging assists the physician in determining a prognosis, planning treatment and evaluating the results of such treatment. Staging systems vary with the types of cancer, but generally involve the following "TNM" system: the type of tumor, indicated by T; whether the cancer has metastasized to nearby lymph nodes, indicated by N; and whether the cancer has metastasized to more distant parts of the body, indicated by M. Generally, if a cancer is only detectable in the area of the primary lesion without having spread to any lymph nodes it is called Stage I. If it has spread only to the closest lymph nodes, it is called Stage II. In Stage III, the cancer has generally spread to the lymph nodes in near proximity to the site of the primary lesion. Cancers that have spread to a distant part of the body, such as the liver, bone, brain or other site, are Stage IV, the most advanced stage.

The polynucleotides and corresponding genes and gene products described herein can facilitate fine-tuning of the staging process by identifying markers for the aggressiveness of a cancer, e.g. the metastatic potential, as well as the presence in different areas of the body. Thus, a Stage II cancer with a polynucleotide signifying a high metastatic potential cancer can be used to change a borderline Stage II tumor to a Stage III tumor, justifying more aggressive therapy. Conversely, the presence of a polynucleotide signifying a lower metastatic potential allows more conservative staging of a tumor.

One type of breast cancer is ductal carcinoma in situ (DCIS): DCIS is when the breast cancer cells are completely contained within the breast ducts (the channels in the breast that carry milk to the nipple), and have not spread into the surrounding breast tissue. This may also be referred to as non-invasive or intraductal cancer, as the cancer cells have not yet spread into the surrounding breast tissue and so usually have not spread into any other part of the body.

Lobular carcinoma in situ breast cancer (LCIS) means that cell changes are found in the lining of the lobules of the breast. It can be present in both breasts. It is also referred to as non-invasive cancer as it has not spread into the surrounding breast tissue.

Invasive breast cancer can be staged as follows: Stage 1 tumours: these measure less than two centimetres. The lymph glands in the armpit are not affected and there are no signs that the cancer has spread elsewhere in the body; Stage 2 tumours: these measure between two and five centimetres, or the lymph glands in the armpit are affected, or both. However, there are no signs that the cancer has spread further; Stage 3 tumours: these are larger than five centimetres and may be attached to surrounding structures such as the muscle or skin. The lymph glands are usually affected, but there are no signs that the cancer has spread beyond the breast or the lymph glands in the armpit; Stage 4 tumours: these are of any size, but the lymph glands are usually affected and the cancer has spread to other parts of the body. This is secondary breast cancer.

Grading of cancers. Grade is a term used to describe how closely a tumor resembles normal tissue of its same type. The microscopic appearance of a tumor is used to identify tumor grade based on parameters such as cell morphology, cellular organization, and other markers of differentiation. As a general rule, the grade of a tumor corresponds to its rate of growth or aggressiveness, with undifferentiated or high-grade tumors generally being more aggressive than well-differentiated or low-grade tumors.

The polynucleotides of the Sequence Listing, and their corresponding genes and gene products, can be especially valuable in determining the grade of the tumor, as they not only can aid in determining the differentiation status of the cells of a tumor, they can also identify factors other than differentiation that are valuable in determining the aggressiveness of a tumor, such as metastatic potential.

Low grade means that the cancer cells look very like the normal cells of the breast. They are usually slowly growing and are less likely to spread. In high grade tumors the cells look very abnormal. They are likely to grow more quickly and are more likely to spread.

Assessment of proliferation of cells in tumor. The differential expression level of the polynucleotides described herein can facilitate assessment of the rate of proliferation of tumor cells, and thus provide an indicator of the aggressiveness of the rate of tumor growth. For example, assessment of the relative expression levels of genes involved in cell cycle can provide an indication of cellular proliferation, and thus serve as a marker of proliferation.

Detection of breast cancer.

The polynucleotides corresponding to genes that exhibit the appropriate expression pattern can be used to detect breast cancer in a subject. Breast cancer is one of the most common neoplasms in women, and prevention and early detection are key factors in controlling and curing breast cancer. The expression of appropriate polynucleotides can be used in the diagnosis, prognosis and management of breast cancer. Detection of breast cancer can be determined using expression levels of any of these sequences alone or in combination with the levels of expression of other known cancer genes. Determination of the aggressive nature and/or the metastatic potential of a breast cancer can be determined by comparing levels of one or more gene products of the genes corresponding to the polynucleotides described herein, and comparing total levels of another sequence known to vary in cancerous tissue, *e.g.*, expression of p53, DCC, ras, FAP (see, *e.g.*, Fearon ER, *et al.*, *Cell* (1990) 61(5):759; Hamilton SR *et al.*, *Cancer* (1993) 72:957; Bodmer W, *et al.*, *Nat Genet.* (1994) 4(3):217; Fearon ER, *Ann N Y Acad Sci.* (1995) 768:101). For example, development of breast cancer can be detected by examining the level of expression of a gene corresponding to a polynucleotides described herein to the levels of oncogenes (*e.g.* ras) or tumor suppressor genes (*e.g.* FAP or p53). Thus expression of specific marker polynucleotides can be used to discriminate between normal and cancerous breast tissue, to discriminate between breast cancers with different cells of origin, to discriminate between breast cancers with different potential metastatic rates, etc. For a review of other markers of cancer, see, *e.g.*, Hanahan et al. (2000) *Cell* 100:57-70.

Treatment of breast cancer

The invention further provides methods for reducing growth of breast cancer cells. The methods provide for decreasing the expression of a gene that is differentially expressed in a breast cancer cell or decreasing the level of and/or decreasing an activity of a breast cancer-associated polypeptide. In general, the methods comprise contacting a breast cancer cell with a substance that modulates (1) expression of a gene that is differentially expressed in breast cancer; or (2) a level of and/or an activity of a breast cancer-associated polypeptide.

"Reducing growth of breast cancer cells" includes, but is not limited to, reducing proliferation of breast cancer cells, and reducing the incidence of a non-cancerous breast cell becoming a cancerous breast cell. Whether a reduction in breast cancer cell growth has been achieved can be readily determined using any known assay, including, but not limited to, [³H]-thymidine incorporation; counting cell number over a period of time; detecting and/or measuring a marker associated with breast cancer (*e.g.*, PSA).

The present invention provides methods for treating breast cancer, generally comprising administering to an individual in need thereof a substance that reduces breast cancer cell growth, in an amount sufficient to reduce breast cancer cell growth and treat the breast cancer. Whether a substance, or a specific amount of the substance, is effective in treating breast cancer can be assessed using any of a variety of known diagnostic assays for breast cancer, including, but not limited to, proctoscopy, rectal examination, biopsy, contrast radiographic studies, CAT scan, and detection of a tumor marker associated with breast cancer in the blood of the individual (*e.g.*, PSA (breast-specific antigen)). The substance can be administered systemically or locally. Thus, in some embodiments, the substance is administered locally, and breast cancer growth is decreased at the site of administration. Local administration may be useful in treating, *e.g.*, a solid tumor.

A substance that reduces breast cancer cell growth can be targeted to a breast cancer cell. Thus, in some embodiments, the invention provides a method of delivering a drug to a breast cancer cell, comprising administering a drug-antibody complex to a subject, wherein the antibody is specific for a breast cancer-associated polypeptide, and the drug is one that reduces breast cancer cell growth, a variety of which are known in the art. Targeting can be accomplished by coupling (*e.g.*, linking, directly or via a linker molecule, either covalently or non-covalently, so as to form a drug-antibody complex) a drug to an antibody specific for a breast cancer-associated polypeptide. Methods of coupling a drug to an antibody are well known in the art and need not be elaborated upon herein.

Tumor classification and patient stratification

The invention further provides for methods of classifying tumors, and thus grouping or "stratifying" patients, according to the expression profile of selected differentially expressed genes in a tumor. Differentially expressed genes can be analyzed for correlation with other differentially expressed genes in a single tumor type or across tumor types. Genes that demonstrate consistent correlation in expression profile in a given cancer cell type (*e.g.*, in a breast cancer cell or type of breast cancer) can be grouped together, *e.g.*, when one gene is overexpressed in a tumor, a second gene is also usually overexpressed. Tumors can then be classified according to the expression profile of one or more genes selected from one or more groups.

The tumor of each patient in a pool of potential patients can be classified as described above. Patients having similarly classified tumors can then be selected for participation in an investigative or clinical trial of a cancer therapeutic where a homogeneous population is desired. The tumor classification of a patient can also be used in assessing the efficacy of a

cancer therapeutic in a heterogeneous patient population. In addition, therapy for a patient having a tumor of a given expression profile can then be selected accordingly.

In another embodiment, differentially expressed gene products (*e.g.*, polypeptides or polynucleotides encoding such polypeptides) may be effectively used in treatment through vaccination. The growth of cancer cells is naturally limited in part due to immune surveillance. Stimulation of the immune system using a particular tumor-specific antigen enhances the effect towards the tumor expressing the antigen. An active vaccine comprising a polypeptide encoded by the cDNA of this invention would be appropriately administered to subjects having an alteration, *e.g.*, overabundance, of the corresponding RNA, or those predisposed for developing cancer cells with an alteration of the same RNA. Polypeptide antigens are typically combined with an adjuvant as part of a vaccine composition. The vaccine is preferably administered first as a priming dose, and then again as a boosting dose, usually at least four weeks later. Further boosting doses may be given to enhance the effect. The dose and its timing are usually determined by the person responsible for the treatment.

The invention also encompasses the selection of a therapeutic regimen based upon the expression profile of differentially expressed genes in the patient's tumor. For example, a tumor can be analyzed for its expression profile of the genes corresponding to SEQ ID NOS:1-499 as described herein, *e.g.*, the tumor is analyzed to determine which genes are expressed at elevated levels or at decreased levels relative to normal cells of the same tissue type. The expression patterns of the tumor are then compared to the expression patterns of tumors that respond to a selected therapy. Where the expression profiles of the test tumor cell and the expression profile of a tumor cell of known drug responsivity at least substantially match (*e.g.*, selected sets of genes at elevated levels in the tumor of known drug responsivity and are also at elevated levels in the test tumor cell), then the therapeutic agent selected for therapy is the drug to which tumors with that expression pattern respond.

Pattern matching in diagnosis using arrays

In another embodiment, the diagnostic and/or prognostic methods of the invention involve detection of expression of a selected set of genes in a test sample to produce a test expression pattern (TEP). The TEP is compared to a reference expression pattern (REP), which is generated by detection of expression of the selected set of genes in a reference sample (*e.g.*, a positive or negative control sample). The selected set of genes includes at least one of the genes of the invention, which genes correspond to the polynucleotide sequences described herein. Of particular interest is a selected set of genes that includes gene differentially expressed in the disease for which the test sample is to be screened.

IDENTIFICATION OF THERAPEUTIC TARGETS AND ANTI-CANCER THERAPEUTIC AGENTS

The present invention also encompasses methods for identification of agents having the ability to modulate activity of a differentially expressed gene product, as well as methods for identifying a differentially expressed gene product as a therapeutic target for treatment of cancer, especially breast cancer.

Identification of compounds that modulate activity of a differentially expressed gene product can be accomplished using any of a variety of drug screening techniques. Such agents are candidates for development of cancer therapies. Of particular interest are screening assays for agents that have tolerable toxicity for normal, non-cancerous human cells. The screening assays of the invention are generally based upon the ability of the agent to modulate an activity of a differentially expressed gene product and/or to inhibit or suppress phenomenon associated with cancer (*e.g.*, cell proliferation, colony formation, cell cycle arrest, metastasis, and the like).

Screening of candidate agents

Screening assays can be based upon any of a variety of techniques readily available and known to one of ordinary skill in the art. In general, the screening assays involve contacting a cancerous cell (preferably a cancerous cell such as a cancerous breast cell) with a candidate agent, and assessing the effect upon biological activity of a differentially expressed gene product. The effect upon a biological activity can be detected by, for example, detection of expression of a gene product of a differentially expressed gene (*e.g.*, a decrease in mRNA or polypeptide levels, would in turn cause a decrease in biological activity of the gene product). Alternatively or in addition, the effect of the candidate agent can be assessed by examining the effect of the candidate agent in a functional assay. For example, where the differentially expressed gene product is an enzyme, then the effect upon biological activity can be assessed by detecting a level of enzymatic activity associated with the differentially expressed gene product. The functional assay will be selected according to the differentially expressed gene product. In general, where the differentially expressed gene is increased in expression in a cancerous cell, agents of interest are those that decrease activity of the differentially expressed gene product.

Assays described *infra* can be readily adapted in the screening assay embodiments of the invention. Exemplary assays useful in screening candidate agents include, but are not limited to, hybridization-based assays (*e.g.*, use of nucleic acid probes or primers to assess expression levels), antibody-based assays (*e.g.*, to assess levels of polypeptide gene products), binding assays (*e.g.*, to detect interaction of a candidate agent with a differentially

expressed polypeptide, which assays may be competitive assays where a natural or synthetic ligand for the polypeptide is available), and the like. Additional exemplary assays include, but are not necessarily limited to, cell proliferation assays, antisense knockout assays, assays to detect inhibition of cell cycle, assays of induction of cell death/apoptosis, and the like.

- 5 Generally such assays are conducted *in vitro*, but many assays can be adapted for *in vivo* analyses, *e.g.*, in an animal model of the cancer.

Identification of therapeutic targets

- 10 In another embodiment, the invention contemplates identification of differentially expressed genes and gene products as therapeutic targets. In some respects, this is the converse of the assays described above for identification of agents having activity in modulating (*e.g.*, decreasing or increasing) activity of a differentially expressed gene product.

- 15 In this embodiment, therapeutic targets are identified by examining the effect(s) of an agent that can be demonstrated or has been demonstrated to modulate a cancerous phenotype (*e.g.*, inhibit or suppress or prevent development of a cancerous phenotype). Such agents are generally referred to herein as an "anti-cancer agent", which agents encompass chemotherapeutic agents. For example, the agent can be an antisense oligonucleotide that is specific for a selected gene transcript. For example, the antisense oligonucleotide may have a sequence corresponding to a sequence of a differentially expressed gene described herein, *e.g.*, a sequence of one of SEQ ID NOS:1-499.

- 20 Assays for identification of therapeutic targets can be conducted in a variety of ways using methods that are well known to one of ordinary skill in the art. For example, a test cancerous cell that expresses or overexpresses a differentially expressed gene is contacted with an anti-cancer agent, the effect upon a cancerous phenotype and a biological activity of the candidate gene product assessed. The biological activity of the candidate gene product can be assayed by examining, for example, modulation of expression of a gene encoding the candidate gene product (*e.g.*, as detected by, for example, an increase or decrease in transcript levels or polypeptide levels), or modulation of an enzymatic or other activity of the gene product. The cancerous phenotype can be, for example, cellular proliferation, loss of contact inhibition of growth (*e.g.*, colony formation), tumor growth (*in vitro* or *in vivo*), and the like. Alternatively or in addition, the effect of modulation of a biological activity of the candidate target gene upon cell death/apoptosis or cell cycle regulation can be assessed.

30 Inhibition or suppression of a cancerous phenotype, or an increase in cell death or apoptosis as a result of modulation of biological activity of a candidate gene product

indicates that the candidate gene product is a suitable target for cancer therapy. Assays described *infra* can be readily adapted for assays for identification of therapeutic targets. Generally such assays are conducted *in vitro*, but many assays can be adapted for *in vivo* analyses, *e.g.*, in an appropriate, art-accepted animal model of the cancer.

5 Candidate agents

The term "agent" as used herein describes any molecule, *e.g.* protein or pharmaceutical, with the capability of modulating a biological activity of a gene product of a differentially expressed gene. Generally a plurality of assay mixtures are run in parallel with different agent concentrations to obtain a differential response to the various concentrations. Typically, one of these concentrations serves as a negative control, *i.e.* at zero concentration or below the level of detection.

Candidate agents encompass numerous chemical classes, though typically they are organic molecules, preferably small organic compounds having a molecular weight of more than 50 and less than about 2,500 daltons. Candidate agents comprise functional groups necessary for structural interaction with proteins, particularly hydrogen bonding, and typically include at least an amine, carbonyl, hydroxyl or carboxyl group, preferably at least two of the functional chemical groups. The candidate agents often comprise cyclical carbon or heterocyclic structures and/or aromatic or polyaromatic structures substituted with one or more of the above functional groups. Candidate agents are also found among biomolecules including, but not limited to: peptides, saccharides, fatty acids, steroids, purines, pyrimidines, derivatives, structural analogs or combinations thereof.

Candidate agents are obtained from a wide variety of sources including libraries of synthetic or natural compounds. For example, numerous means are available for random and directed synthesis of a wide variety of organic compounds and biomolecules, including expression of randomized oligonucleotides and oligopeptides. Alternatively, libraries of natural compounds in the form of bacterial, fungal, plant and animal extracts (including extracts from human tissue to identify endogenous factors affecting differentially expressed gene products) are available or readily produced. Additionally, natural or synthetically produced libraries and compounds are readily modified through conventional chemical, physical and biochemical means, and may be used to produce combinatorial libraries. Known pharmacological agents may be subjected to directed or random chemical modifications, such as acylation, alkylation, esterification, amidification, *etc.* to produce structural analogs.

Exemplary candidate agents of particular interest include, but are not limited to, antisense and RNAi polynucleotides, and antibodies, soluble receptors, and the like. Antibodies and soluble receptors are of particular interest as candidate agents where the target differentially expressed gene product is secreted or accessible at the cell-surface (*e.g.*,
5 receptors and other molecule stably-associated with the outer cell membrane).

For method that involve RNAi (RNA interference), a double stranded RNA (dsRNA) molecule is usually used. The dsRNA is prepared to be substantially identical to at least a segment of a subject polynucleotide (*e.g.* a cDNA or gene). In general, the dsRNA is selected to have at least 70%, 75%, 80%, 85% or 90% sequence identity with the subject
10 polynucleotide over at least a segment of the candidate gene. In other instances, the sequence identity is even higher, such as 95%, 97% or 99%, and in still other instances, there is 100% sequence identity with the subject polynucleotide over at least a segment of the subject polynucleotide. The size of the segment over which there is sequence identity can vary depending upon the size of the subject polynucleotide. In general, however, there is
15 substantial sequence identity over at least 15, 20, 25, 30, 35, 40 or 50 nucleotides. In other instances, there is substantial sequence identity over at least 100, 200, 300, 400, 500 or 1000 nucleotides; in still other instances, there is substantial sequence identity over the entire length of the subject polynucleotide, *i.e.*, the coding and non-coding region of the candidate gene.

20 Because only substantial sequence similarity between the subject polynucleotide and the dsRNA is necessary, sequence variations between these two species arising from genetic mutations, evolutionary divergence and polymorphisms can be tolerated. Moreover, as described further infra, the dsRNA can include various modified or nucleotide analogs.

Usually the dsRNA consists of two separate complementary RNA strands. However,
25 in some instances, the dsRNA may be formed by a single strand of RNA that is self-complementary, such that the strand loops back upon itself to form a hairpin loop. Regardless of form, RNA duplex formation can occur inside or outside of a cell.

The size of the dsRNA that is utilized varies according to the size of the subject polynucleotide whose expression is to be suppressed and is sufficiently long to be effective
30 in reducing expression of the subject polynucleotide in a cell. Generally, the dsRNA is at least 10-15 nucleotides long. In certain applications, the dsRNA is less than 20, 21, 22, 23, 24 or 25 nucleotides in length. In other instances, the dsRNA is at least 50, 100, 150 or 200 nucleotides in length. The dsRNA can be longer still in certain other applications, such as at least 300, 400, 500 or 600 nucleotides. Typically, the dsRNA is not longer than 3000

nucleotides. The optimal size for any particular subject polynucleotide can be determined by one of ordinary skill in the art without undue experimentation by varying the size of the dsRNA in a systematic fashion and determining whether the size selected is effective in interfering with expression of the subject polynucleotide.

5 dsRNA can be prepared according to any of a number of methods that are known in the art, including *in vitro* and *in vivo* methods, as well as by synthetic chemistry approaches.

In vitro methods. Certain methods generally involve inserting the segment corresponding to the candidate gene that is to be transcribed between a promoter or pair of promoters that are oriented to drive transcription of the inserted segment and then utilizing
10 an appropriate RNA polymerase to carry out transcription. One such arrangement involves positioning a DNA fragment corresponding to the candidate gene or segment thereof into a vector such that it is flanked by two opposable polymerase-specific promoters that can be same or different. Transcription from such promoters produces two complementary RNA strands that can subsequently anneal to form the desired dsRNA. Exemplary plasmids for
15 use in such systems include the plasmid (PCR 4.0 TOPO) (available from Invitrogen). Another example is the vector pGEM-T (Promega, Madison, WI) in which the oppositely oriented promoters are T7 and SP6; the T3 promoter can also be utilized.

In a second arrangement, DNA fragments corresponding to the segment of the subject polynucleotide that is to be transcribed is inserted both in the sense and antisense
20 orientation downstream of a single promoter. In this system, the sense and antisense fragments are cotranscribed to generate a single RNA strand that is self-complementary and thus can form dsRNA.

Various other *in vitro* methods have been described. Examples of such methods include, but are not limited to, the methods described by Sadher et al. (Biochem. Int.
25 14:1015, 1987); by Bhattacharyya (Nature 343:484, 1990); and by Livache, et al. (U.S. Patent No. 5,795,715), each of which is incorporated herein by reference in its entirety.

Single-stranded RNA can also be produced using a combination of enzymatic and organic synthesis or by total organic synthesis. The use of synthetic chemical methods enable one to introduce desired modified nucleotides or nucleotide analogs into the dsRNA.

30 *In vivo methods.* dsRNA can also be prepared *in vivo* according to a number of established methods (see, e.g., Sambrook, et al. (1989) Molecular Cloning: A Laboratory Manual, 2nd ed.; Transcription and Translation (B.D. Hames, and S.J. Higgins, Eds., 1984); DNA Cloning, volumes I and II (D.N. Glover, Ed., 1985); and Oligonucleotide Synthesis (M.J. Gait, Ed., 1984, each of which is incorporated herein by reference in its entirety).

Once the single-stranded RNA has been formed, the complementary strands are allowed to anneal to form duplex RNA. Transcripts are typically treated with DNAase and further purified according to established protocols to remove proteins. Usually such purification methods are not conducted with phenol:chloroform. The resulting purified transcripts are subsequently dissolved in RNAase free water or a buffer of suitable composition.

dsRNA is generated by annealing the sense and anti-sense RNA in vitro. Generally, the strands are initially denatured to keep the strands separate and to avoid self-annealing. During the annealing process, typically certain ratios of the sense and antisense strands are combined to facilitate the annealing process. In some instances, a molar ratio of sense to antisense strands of 3:7 is used; in other instances, a ratio of 4:6 is utilized; and in still other instances, the ratio is 1:1.

The buffer composition utilized during the annealing process can in some instances affect the efficacy of the annealing process and subsequent transfection procedure. While some have indicated that the buffered solution used to carry out the annealing process should include a potassium salt such as potassium chloride (e.g. at a concentration of about 80 mM). In some embodiments, the buffer is substantially potassium free. Once single-stranded RNA has annealed to form duplex RNA, typically any single-strand overhangs are removed using an enzyme that specifically cleaves such overhangs (e.g., RNAase A or RNAase T).

Once the dsRNA has been formed, it is introduced into a reference cell, which can include an individual cell or a population of cells (e.g., a tissue, an embryo and an entire organism). The cell can be from essentially any source, including animal, plant, viral, bacterial, fungal and other sources. If a tissue, the tissue can include dividing or nondividing and differentiated or undifferentiated cells. Further, the tissue can include germ line cells and somatic cells. Examples of differentiated cells that can be utilized include, but are not limited to, neurons, glial cells, blood cells, megakaryocytes, lymphocytes, macrophages, neutrophils, eosinophils, basophils, mast cells, leukocytes, granulocytes, keratinocytes, adipocytes, osteoblasts, osteoclasts, hepatocytes, cells of the endocrine or exocrine glands, fibroblasts, myocytes, cardiomyocytes, and endothelial cells. The cell can be an individual cell of an embryo, and can be a blastocyte or an oocyte.

Certain methods are conducted using model systems for particular cellular states (e.g., a disease). For instance, certain methods provided herein are conducted with a cancer cell lines that serves as a model system for investigating genes that are correlated with various cancers.

A number of options can be utilized to deliver the dsRNA into a cell or population of cells such as in a cell culture, tissue or embryo. For instance, RNA can be directly introduced intracellularly. Various physical methods are generally utilized in such instances, such as administration by microinjection (see, e.g., Zernicka-Goetz, et al. (1997)

5 Development 124:1133-1137; and Wianny, et al. (1998) Chromosoma 107: 430-439).

Other options for cellular delivery include permeabilizing the cell membrane and electroporation in the presence of the dsRNA, liposome-mediated transfection, or transfection using chemicals such as calcium phosphate. A number of established gene therapy techniques can also be utilized to introduce the dsRNA into a cell. By introducing a
10 viral construct within a viral particle, for instance, one can achieve efficient introduction of an expression construct into the cell and transcription of the RNA encoded by the construct.

If the dsRNA is to be introduced into an organism or tissue, gene gun technology is an option that can be employed. This generally involves immobilizing the dsRNA on a gold particle which is subsequently fired into the desired tissue. Research has also shown that
15 mammalian cells have transport mechanisms for taking in dsRNA (see, e.g., Asher, et al. (1969) Nature 223:715-717). Consequently, another delivery option is to administer the dsRNA extracellularly into a body cavity, interstitial space or into the blood system of the mammal for subsequent uptake by such transport processes. The blood and lymph systems and the cerebrospinal fluid are potential sites for injecting dsRNA. Oral, topical, parenteral,
20 rectal and intraperitoneal administration are also possible modes of administration.

The composition introduced can also include various other agents in addition to the dsRNA. Examples of such agents include, but are not limited to, those that stabilize the dsRNA, enhance cellular uptake and/or increase the extent of interference. Typically, the dsRNA is introduced in a buffer that is compatible with the composition of the cell into
25 which the RNA is introduced to prevent the cell from being shocked. The minimum size of the dsRNA that effectively achieves gene silencing can also influence the choice of delivery system and solution composition.

Sufficient dsRNA is introduced into the tissue to cause a detectable change in expression of a target gene (assuming the candidate gene is in fact being expressed in the cell
30 into which the dsRNA is introduced) using available detection methodologies. Thus, in some instances, sufficient dsRNA is introduced to achieve at least a 5-10% reduction in candidate gene expression as compared to a cell in which the dsRNA is not introduced. In other instances, inhibition is at least 20, 30, 40 or 50%. In still other instances, the inhibition

is at least 60, 70, 80, 90 or 95%. Expression in some instances is essentially completely inhibited to undetectable levels.

The amount of dsRNA introduced depends upon various factors such as the mode of administration utilized, the size of the dsRNA, the number of cells into which dsRNA is administered, and the age and size of an animal if dsRNA is introduced into an animal. An appropriate amount can be determined by those of ordinary skill in the art by initially administering dsRNA at several different concentrations for example, for example. In certain instances when dsRNA is introduced into a cell culture, the amount of dsRNA introduced into the cells varies from about 0.5 to 3 μg per 10^6 cells.

A number of options are available to detect interference of candidate gene expression (i.e., to detect candidate gene silencing). In general, inhibition in expression is detected by detecting a decrease in the level of the protein encoded by the candidate gene, determining the level of mRNA transcribed from the gene and/or detecting a change in phenotype associated with candidate gene expression.

USE OF POLYPEPTIDES TO SCREEN FOR PEPTIDE ANALOGS AND ANTAGONISTS

Polypeptides encoded by differentially expressed genes identified herein can be used to screen peptide libraries to identify binding partners, such as receptors, from among the encoded polypeptides. Peptide libraries can be synthesized according to methods known in the art (*see, e.g.*, USPN 5,010,175 and WO 91/17823).

Agonists or antagonists of the polypeptides of the invention can be screened using any available method known in the art, such as signal transduction, antibody binding, receptor binding, mitogenic assays, chemotaxis assays, etc. The assay conditions ideally should resemble the conditions under which the native activity is exhibited *in vivo*, that is, under physiologic pH, temperature, and ionic strength. Suitable agonists or antagonists will exhibit strong inhibition or enhancement of the native activity at concentrations that do not cause toxic side effects in the subject. Agonists or antagonists that compete for binding to the native polypeptide can require concentrations equal to or greater than the native concentration, while inhibitors capable of binding irreversibly to the polypeptide can be added in concentrations on the order of the native concentration.

Such screening and experimentation can lead to identification of a polypeptide binding partner, such as a receptor, encoded by a gene or a cDNA corresponding to a polynucleotide described herein, and at least one peptide agonist or antagonist of the binding partner. Such agonists and antagonists can be used to modulate, enhance, or inhibit receptor

function in cells to which the receptor is native, or in cells that possess the receptor as a result of genetic engineering. Further, if the receptor shares biologically important characteristics with a known receptor, information about agonist/antagonist binding can facilitate development of improved agonists/antagonists of the known receptor.

5

VACCINES AND USES

The differentially expressed nucleic acids and polypeptides produced by the nucleic acids of the invention can also be used to modulate primary immune response to prevent or treat cancer. Every immune response is a complex and intricately regulated sequence of events involving several cell types. It is triggered when an antigen enters the body and encounters a specialized class of cells called antigen-presenting cells (APCs). These APCs capture a minute amount of the antigen and display it in a form that can be recognized by antigen-specific helper T lymphocytes. The helper (Th) cells become activated and, in turn, promote the activation of other classes of lymphocytes, such as B cells or cytotoxic T cells. The activated lymphocytes then proliferate and carry out their specific effector functions, which in many cases successfully activate or eliminate the antigen. Thus, activating the immune response to a particular antigen associated with a cancer cell can protect the patient from developing cancer or result in lymphocytes eliminating cancer cells expressing the antigen.

Gene products, including polypeptides, mRNA (particularly mRNAs having distinct secondary and/or tertiary structures), cDNA, or complete gene, can be prepared and used in vaccines for the treatment or prevention of hyperproliferative disorders and cancers. The nucleic acids and polypeptides can be utilized to enhance the immune response, prevent tumor progression, prevent hyperproliferative cell growth, and the like. Methods for selecting nucleic acids and polypeptides that are capable of enhancing the immune response are known in the art. Preferably, the gene products for use in a vaccine are gene products which are present on the surface of a cell and are recognizable by lymphocytes and antibodies.

The gene products may be formulated with pharmaceutically acceptable carriers into pharmaceutical compositions by methods known in the art. The composition is useful as a vaccine to prevent or treat cancer. The composition may further comprise at least one co-immunostimulatory molecule, including but not limited to one or more major histocompatibility complex (MHC) molecules, such as a class I or class II molecule, preferably a class I molecule. The composition may further comprise other stimulator

molecules including B7.1, B7.2, ICAM-1, ICAM-2, LFA-1, LFA-3, CD72 and the like, immunostimulatory polynucleotides (which comprise an 5'-CG-3' wherein the cytosine is unmethylated), and cytokines which include but are not limited to IL-1 through IL-15, TNF- α , IFN- γ , RANTES, G-CSF, M-CSF, IFN- α , CTAP III, ENA-78, GRO, I-309, PF-4, IP-10, LD-78, MGSA, MIP-1 α , MIP-1 β , or combination thereof, and the like for immunopotentialiation. In one embodiment, the immunopotentialiators of particular interest are those that facilitate a Th1 immune response.

The gene products may also be prepared with a carrier that will protect the gene products against rapid elimination from the body, such as a controlled release formulation, including implants and microencapsulated delivery systems. Biodegradable polymers can be used, such as ethylene vinyl acetate, polyanhydrides, polyglycolic acid, collagen, polyorthoesters, polylactic acid, and the like. Methods for preparation of such formulations are known in the art.

In the methods of preventing or treating cancer, the gene products may be administered via one of several routes including but not limited to transdermal, transmucosal, intravenous, intramuscular, subcutaneous, intradermal, intraperitoneal, intrathecal, intrapleural, intrauterine, rectal, vaginal, topical, intratumor, and the like. For transmucosal or transdermal administration, penetrants appropriate to the barrier to be permeated are used in the formulation. Such penetrants are generally known in the art, and include, for example, administration bile salts and fusidic acid derivatives. In addition, detergents may be used to facilitate permeation. Transmucosal administration may be by nasal sprays or suppositories. For oral administration, the gene products are formulated into conventional oral administration form such as capsules, tablets, elixirs and the like.

The gene product is administered to a patient in an amount effective to prevent or treat cancer. In general, it is desirable to provide the patient with a dosage of gene product of at least about 1 pg per Kg body weight, preferably at least about 1 ng per Kg body weight, more preferably at least about 1 μ g or greater per Kg body weight of the recipient. A range of from about 1 ng per Kg body weight to about 100 mg per Kg body weight is preferred although a lower or higher dose may be administered. The dose is effective to prime, stimulate and/or cause the clonal expansion of antigen-specific T lymphocytes, preferably cytotoxic T lymphocytes, which in turn are capable of preventing or treating cancer in the recipient. The dose is administered at least once and may be provided as a bolus or a continuous administration. Multiple administrations of the dose over a period of several weeks to months may be preferable. Subsequent doses may be administered as indicated.

In another method of treatment, autologous cytotoxic lymphocytes or tumor infiltrating lymphocytes may be obtained from a patient with cancer. The lymphocytes are grown in culture, and antigen-specific lymphocytes are expanded by culturing in the presence of the specific gene products alone or in combination with at least one co-immunostimulatory molecule with cytokines. The antigen-specific lymphocytes are then infused back into the patient in an amount effective to reduce or eliminate the tumors in the patient. Cancer vaccines and their uses are further described in USPN 5,961,978; USPN 5,993,829; USPN 6,132,980; and WO 00/38706.

10 PHARMACEUTICAL COMPOSITIONS AND USES

Pharmaceutical compositions can comprise polypeptides, receptors that specifically bind a polypeptide produced by a differentially expressed gene (*e.g.*, antibodies, or polynucleotides (including antisense nucleotides and ribozymes) of the claimed invention in a therapeutically effective amount. The compositions can be used to treat primary tumors as well as metastases of primary tumors. In addition, the pharmaceutical compositions can be used in conjunction with conventional methods of cancer treatment, *e.g.*, to sensitize tumors to radiation or conventional chemotherapy.

Where the pharmaceutical composition comprises a receptor (such as an antibody) that specifically binds to a gene product encoded by a differentially expressed gene, the receptor can be coupled to a drug for delivery to a treatment site or coupled to a detectable label to facilitate imaging of a site comprising breast cancer cells. Methods for coupling antibodies to drugs and detectable labels are well known in the art, as are methods for imaging using detectable labels.

The term "therapeutically effective amount" as used herein refers to an amount of a therapeutic agent to treat, ameliorate, or prevent a desired disease or condition, or to exhibit a detectable therapeutic or preventative effect. The effect can be detected by, for example, chemical markers or antigen levels. Therapeutic effects also include reduction in physical symptoms, such as decreased body temperature.

The precise effective amount for a subject will depend upon the subject's size and health, the nature and extent of the condition, and the therapeutics or combination of therapeutics selected for administration. Thus, it is not useful to specify an exact effective amount in advance. However, the effective amount for a given situation is determined by routine experimentation and is within the judgment of the clinician. For purposes of the present invention, an effective dose will generally be from about 0.01 mg/kg to 50 mg/kg or

0.05 mg/kg to about 10 mg/kg of the DNA constructs in the individual to which it is administered.

A pharmaceutical composition can also contain a pharmaceutically acceptable carrier. The term "pharmaceutically acceptable carrier" refers to a carrier for administration of a therapeutic agent, such as antibodies or a polypeptide, genes, and other therapeutic agents. The term refers to any pharmaceutical carrier that does not itself induce the production of antibodies harmful to the individual receiving the composition, and which can be administered without undue toxicity. Suitable carriers can be large, slowly metabolized macromolecules such as proteins, polysaccharides, polylactic acids, polyglycolic acids, polymeric amino acids, amino acid copolymers, lipid aggregates and inactive virus particles. Such carriers are well known to those of ordinary skill in the art. Pharmaceutically acceptable carriers in therapeutic compositions can include liquids such as water, saline, glycerol and ethanol. Auxiliary substances, such as wetting or emulsifying agents, pH buffering substances, and the like, can also be present in such vehicles.

Typically, the therapeutic compositions are prepared as injectables, either as liquid solutions or suspensions; solid forms suitable for solution in, or suspension in, liquid vehicles prior to injection can also be prepared. Liposomes are included within the definition of a pharmaceutically acceptable carrier. Pharmaceutically acceptable salts can also be present in the pharmaceutical composition, e.g., mineral acid salts such as hydrochlorides, hydrobromides, phosphates, sulfates, and the like; and the salts of organic acids such as acetates, propionates, malonates, benzoates, and the like. A thorough discussion of pharmaceutically acceptable excipients is available in *Remington: The Science and Practice of Pharmacy* (1995) Alfonso Gennaro, Lippincott, Williams, & Wilkins.

DELIVERY METHODS

Once formulated, the compositions contemplated by the invention can be (1) administered directly to the subject (e.g., as polynucleotide, polypeptides, small molecule agonists or antagonists, and the like); or (2) delivered ex vivo, to cells derived from the subject (e.g., as in *ex vivo* gene therapy). Direct delivery of the compositions will generally be accomplished by parenteral injection, e.g., subcutaneously, intraperitoneally, intravenously or intramuscularly, intratumoral or to the interstitial space of a tissue. Other modes of administration include oral and pulmonary administration, suppositories, and transdermal applications, needles, and gene guns or hyposprays. Dosage treatment can be a single dose schedule or a multiple dose schedule.

Methods for the ex vivo delivery and reimplantation of transformed cells into a subject are known in the art and described in e.g., International Publication No. WO 93/14778. Examples of cells useful in ex vivo applications include, for example, stem cells, particularly hematopoietic, lymph cells, macrophages, dendritic cells, or tumor cells.

5 Generally, delivery of nucleic acids for both ex vivo and in vitro applications can be accomplished by, for example, dextran-mediated transfection, calcium phosphate precipitation, polybrene mediated transfection, protoplast fusion, electroporation, encapsulation of the polynucleotide(s) in liposomes, and direct microinjection of the DNA into nuclei, all well known in the art.

10 Once differential expression of a gene corresponding to a polynucleotide described herein has been found to correlate with a proliferative disorder, such as neoplasia, dysplasia, and hyperplasia, the disorder can be amenable to treatment by administration of a therapeutic agent based on the provided polynucleotide, corresponding polypeptide or other corresponding molecule (e.g., antisense, ribozyme, etc.). In other embodiments, the disorder
15 can be amenable to treatment by administration of a small molecule drug that, for example, serves as an inhibitor (antagonist) of the function of the encoded gene product of a gene having increased expression in cancerous cells relative to normal cells or as an agonist for gene products that are decreased in expression in cancerous cells (e.g., to promote the activity of gene products that act as tumor suppressors).

20 The dose and the means of administration of the inventive pharmaceutical compositions are determined based on the specific qualities of the therapeutic composition, the condition, age, and weight of the patient, the progression of the disease, and other relevant factors. For example, administration of polynucleotide therapeutic composition agents includes local or systemic administration, including injection, oral administration,
25 particle gun or catheterized administration, and topical administration. In general, the therapeutic polynucleotide composition contains an expression construct comprising a promoter operably linked to a polynucleotide of at least 12, 22, 25, 30, or 35 contiguous nt of the polynucleotide disclosed herein. Various methods can be used to administer the therapeutic composition directly to a specific site in the body. For example, a small
30 metastatic lesion is located and the therapeutic composition injected several times in several different locations within the body of the tumor. Alternatively, arteries which serve a tumor are identified, and the therapeutic composition injected into such an artery, in order to deliver the composition directly into the tumor. A tumor that has a necrotic center is aspirated and the composition injected directly into the now empty center of the tumor. The

antisense composition is directly administered to the surface of the tumor, for example, by topical application of the composition. X-ray imaging is used to assist in certain of the above delivery methods.

Targeted delivery of therapeutic compositions containing an antisense
5 polynucleotide, subgenomic polynucleotides, or antibodies to specific tissues can also be used. Receptor-mediated DNA delivery techniques are described in, for example, Findeis et al., Trends Biotechnol. (1993) 11:202; Chiou et al., Gene Therapeutics: Methods And Applications Of Direct Gene Transfer (J.A. Wolff, ed.) (1994); Wu et al., J. Biol. Chem. (1988) 263:621; Wu et al., J. Biol. Chem. (1994) 269:542; Zenke et al., Proc. Natl. Acad.
10 Sci. (USA) (1990) 87:3655; Wu et al., J. Biol. Chem. (1991) 266:338. Therapeutic compositions containing a polynucleotide are administered in a range of about 100 ng to about 200 mg of DNA for local administration in a gene therapy protocol. Concentration ranges of about 500 ng to about 50 mg, about 1 μ g to about 2 mg, about 5 μ g to about 500 μ g, and about 20 μ g to about 100 μ g of DNA can also be used during a gene therapy
15 protocol. Factors such as method of action (e.g., for enhancing or inhibiting levels of the encoded gene product) and efficacy of transformation and expression are considerations that will affect the dosage required for ultimate efficacy of the antisense subgenomic polynucleotides.

Where greater expression is desired over a larger area of tissue, larger amounts of
20 antisense subgenomic polynucleotides or the same amounts readministered in a successive protocol of administrations, or several administrations to different adjacent or close tissue portions of, for example, a tumor site, may be required to effect a positive therapeutic outcome. In all cases, routine experimentation in clinical trials will determine specific ranges for optimal therapeutic effect. For polynucleotide related genes encoding
25 polypeptides or proteins with anti-inflammatory activity, suitable use, doses, and administration are described in USPN 5,654,173.

The therapeutic polynucleotides and polypeptides of the present invention can be delivered using gene delivery vehicles. The gene delivery vehicle can be of viral or non-viral origin (see generally, Jolly, Cancer Gene Therapy (1994) 1:51; Kimura, Human Gene
30 Therapy (1994) 5:845; Connelly, Human Gene Therapy (1995) 1:185; and Kaplitt, Nature Genetics (1994) 6:148). Expression of such coding sequences can be induced using endogenous mammalian or heterologous promoters. Expression of the coding sequence can be either constitutive or regulated.

Viral-based vectors for delivery of a desired polynucleotide and expression in a desired cell are well known in the art. Exemplary viral-based vehicles include, but are not limited to, recombinant retroviruses (see, e.g., WO 90/07936; WO 94/03622; WO 93/25698; WO 93/25234; USPN 5, 219,740; WO 93/11230; WO 93/10218; USPN 4,777,127; GB
5 Patent No. 2,200,651; EP 0 345 242; and WO 91/02805), alphavirus-based vectors (e.g., Sindbis virus vectors, Semliki forest virus (ATCC VR-67; ATCC VR-1247), Ross River virus (ATCC VR-373; ATCC VR-1246) and Venezuelan equine encephalitis virus (ATCC VR-923; ATCC VR-1250; ATCC VR 1249; ATCC VR-532), and adeno-associated virus (AAV) vectors (see, e.g., WO 94/12649, WO 93/03769; WO 93/19191; WO 94/28938;
10 WO 95/11984 and WO 95/00655). Administration of DNA linked to killed adenovirus as described in Curiel, *Hum. Gene Ther.* (1992) 3:147 can also be employed.

Non-viral delivery vehicles and methods can also be employed, including, but not limited to, polycationic condensed DNA linked or unlinked to killed adenovirus alone (see, e.g., Curiel, *Hum. Gene Ther.* (1992) 3:147); ligand-linked DNA (see, e.g., Wu, *J. Biol.*
15 *Chem.* (1989) 264:16985); eukaryotic cell delivery vehicles cells (see, e.g., USPN 5,814,482; WO 95/07994; WO 96/17072; WO 95/30763; and WO 97/42338) and nucleic charge neutralization or fusion with cell membranes. Naked DNA can also be employed. Exemplary naked DNA introduction methods are described in WO 90/11092 and USPN
20 5,580,859. Liposomes that can act as gene delivery vehicles are described in USPN 5,422,120; WO 95/13796; WO 94/23697; WO 91/14445; and EP 0524968. Additional approaches are described in Philip, *Mol. Cell Biol.* (1994) 14:2411, and in Woffendin, *Proc. Natl. Acad. Sci.* (1994) 91:1581.

Further non-viral delivery suitable for use includes mechanical delivery systems such as the approach described in Woffendin *et al.*, *Proc. Natl. Acad. Sci. USA* (1994)
25 91(24):11581. Moreover, the coding sequence and the product of expression of such can be delivered through deposition of photopolymerized hydrogel materials or use of ionizing radiation (see, e.g., USPN 5,206,152 and WO 92/11033). Other conventional methods for gene delivery that can be used for delivery of the coding sequence include, for example, use
30 of hand-held gene transfer particle gun (see, e.g., USPN 5,149,655); use of ionizing radiation for activating transferred gene (see, e.g., USPN 5,206,152 and WO 92/11033).

EXAMPLES

The following examples are put forth so as to provide those of ordinary skill in the art with a complete disclosure and description of how to make and use the present invention,

and are not intended to limit the scope of what the inventors regard as their invention nor are they intended to represent that the experiments below are all or the only experiments performed. Efforts have been made to ensure accuracy with respect to numbers used (e.g. amounts, temperature, etc.) but some experimental errors and deviations should be accounted for. Unless indicated otherwise, parts are parts by weight, molecular weight is weight average molecular weight, temperature is in degrees Centigrade, and pressure is at or near atmospheric.

EXAMPLE 1:

SOURCE OF BIOLOGICAL MATERIALS

10 The cells used for detecting differential expression of breast cancer related genes were those previously described for the HMT-3522 tumor reversion model, disclosed in U.S. Patent Nos. 5,846,536 and 6,123,941, herein incorporated by reference. The model utilizes both non-tumorigenic (HMT-3522 S1) and tumorigenic (HMT-3522 T4-2) cells derived by serial passaging from a single reduction mammoplasty. In two dimensional (2D)
15 monolayers on plastic, both S1 and T4-2 cells display similar morphology. But in three dimensional (3D) matrigel cultures, S1 form phenotypically normal mammary tissue structures while T4-2 cells fail to organize into these structures and instead disseminate into the matrix. This assay was designated as a tumor reversion model, in that the T4-2 cells can be induced to form S1-like structures in 3D by treatment with beta-1 integrin or EGFR
20 blocking antibodies, or by treating with a chemical inhibitor of the EGFR signaling pathway (tyrophostin AG 1478). These treated T4-2 cells, called T4R cells, are non-tumorigenic.

EXAMPLE 2:

CELL GROWTH AND RNA ISOLATION

Growth of Cells 2D and 3D for Microarray Experiments: HMT3522 S1 and T4-2
25 cells were grown 2D and 3D and T4-2 cells reverted with anti-EGFR, anti-beta 1 integrin, or tyrophostin AG 1478 as previously described (Weaver et al J Cell Biol. 137:231-45, 1997; and Wang et al PNAS 95:14821-14826, 1998). Anti-EGFR (mAb 225) was purchased from Oncogene and introduced into the matrigel at the time of gelation at a concentration of 4 ug/ml purified mouse IgG1. Anti-beta 1 integrin (mAb AIIB2) was a gift from C. Damsky
30 at the University of California at San Francisco and was also introduced into the matrigel at the time of gelation at a concentration of 100 ug/ml ascites protein (which corresponds to 4-10 ug/ml purified rat IgG1). Tyrophostin AG 1478 was purchased from Calbiochem and used at a concentration of 100 nM.

Isolation of RNA for Microarray Experiments: RNA was prepared from: S1 passage 60 2D cultures; T4-2 passage 41 2D cultures; S1 passage 59 3D cultures; and T4-2 and T4-2 revertant (with anti-EGFR, anti-beta 1 integrin, and tyrophostin) passage 35 3D cultures.

All RNA for microarray experiments was isolated using the commercially available RNeasy Mini Kit from Qiagen. Isolation of total RNA from cells grown 2D was performed as instructed in the kit handbook. Briefly, media was aspirated from the cells and kit Buffer RLT was added directly to the flask. The cell lysate was collected with a rubber cell scraper, and the lysate passed 5 times through a 20-G needle fitted to a syringe. One volume of 70% ethanol was added to the homogenized lysate and mixed well by pipetting. Up to 700 ul of sample was applied to an RNeasy mini spin column sitting in a 2-ml collection tube and centrifuged for 15 seconds at $>8000 \times g$. 700 ul Buffer RW1 was added to the column and centrifuged for 15 seconds at $>8000 \times g$ to wash. The column was transferred to a new collection tube. 500 ul Buffer RPE was added to the column and centrifuged for 15 seconds at $>8000 \times g$ to wash. Another 500 ul Buffer RPE was added to the column for additional washing, and the column centrifuged for 2 minutes at maximum speed to dry. The column was transferred to a new collection tube and RNA eluted from the column with 30 ul RNase-free water by centrifuging for 1 minute at $>8000 \times g$.

Isolation of total RNA from cells grown 3D was performed as described above, except cells were isolated from matrigel prior to RNA isolation. The cells were isolated as colonies from matrigel using ice-cold PBS/EDTA (0.01 M sodium phosphate pH 7.2 containing 138 mM sodium chloride and 5 mM EDTA). See Weaver et al, J Cell Biol 137:231-245, 1997; and Wang et al. PNAS 95:14821-14826, 1998.

EXAMPLE 3:

DETECTION AND IDENTIFICATION OF GENES EXHIBITING DIFFERENTIAL EXPRESSION

The relative expression levels of a selected sequence (which in turn is representative of a single transcript) were examined in the tumorigenic versus non-tumorigenic cell lines described above, following culturing of the cells (S1, T4-2 and T4R) in either two-dimensional (2D) monolayers or three-dimensional (3D) matrigel cultures as described above. Differential expression for a selected sequence was assessed by hybridizing mRNA from S1 and T4-2 2D cultures, and S1, T4-2 and T4R 3D cultures to microarray chips as described below, as follows: Exp1 = T4-2 2D/S1 2D; Exp2 = T4-2 3D/S1 3D; Exp3 = S1 3D/S1 2D; Exp4 = T4-2 3D/T4-2 2D; Exp5 = T4-2 3D/T4R (anti-EGFR) 3D; Exp6 = T4-2 3D/T4R (anti-beta1 integrin) 3D; and Exp7 = T4-2 3D/T4R (tyrophostin AG 1478) 3D.

Each array used had an identical spatial layout and control spot set. Each microarray was divided into two areas, each area having an array with, on each half, twelve groupings of 32 x 12 spots for a total of about 9,216 spots on each array. The two areas are spotted identically which provide for at least two duplicates of each clone per array. Spotting was accomplished using PCR amplified products from 0.5kb to 2.0 kb and spotted using a Molecular Dynamics Gen III spotter according to the manufacturer's recommendations. The first row of each of the 24 regions on the array had about 32 control spots, including 4 negative control spots and 8 test polynucleotides.

The test polynucleotides were spiked into each sample before the labeling reaction with a range of concentrations from 2-600 pg/slide and ratios of 1:1. For each array design, two slides were hybridized with the test samples reverse-labeled in the labeling reaction. This provided for about 4 duplicate measurements for each clone, two of one color and two of the other, for each sample.

Identification Of Differentially Expressed Genes: "Differentially expressed" in the context of the present example meant that there was a difference in expression of a particular gene between tumorigenic vs. non-tumorigenic cells, or cells grown in three-dimensional culture vs. cells grown in two-dimensional culture. To identify differentially expressed genes, total RNA was first reverse transcribed into cDNA using a primer containing a T7 RNA polymerase promoter, followed by second strand DNA synthesis. cDNA was then transcribed *in vitro* to produce antisense RNA using the T7 promoter-mediated expression (see, e.g., Luo *et al.* (1999) *Nature Med* 5:117-122), and the antisense RNA was then converted into cDNA. The second set of cDNAs were again transcribed *in vitro*, using the T7 promoter, to provide antisense RNA. Optionally, the RNA was again converted into cDNA, allowing for up to a third round of T7-mediated amplification to produce more antisense RNA. Thus the procedure provided for two or three rounds of *in vitro* transcription to produce the final RNA used for fluorescent labeling.

Fluorescent probes were generated by first adding control RNA to the antisense RNA mix, and producing fluorescently labeled cDNA from the RNA starting material. Fluorescently labeled cDNAs prepared from tumorigenic RNA sample were compared to fluorescently labeled cDNAs prepared from non-tumorigenic cell RNA sample. For example, the cDNA probes from the non-tumorigenic cells were labeled with Cy3 fluorescent dye (green) and the cDNA probes prepared from the tumorigenic cells were labeled with Cy5 fluorescent dye (red).

The differential expression assay was performed by mixing equal amounts of probes from tumorigenic cells and non-tumorigenic cells, and/or cells grown in 3D vs. those grown in 2D. The arrays were prehybridized by incubation for about 2 hrs at 60°C in 5X SSC/0.2% SDS/1 mM EDTA, and then washed three times in water and twice in isopropanol.

5 Following prehybridization of the array, the probe mixture was then hybridized to the array under conditions of high stringency (overnight at 42°C in 50% formamide, 5X SSC, and 0.2% SDS). After hybridization, the array was washed at 55°C three times as follows: 1) first wash in 1X SSC/0.2% SDS; 2) second wash in 0.1X SSC/0.2% SDS; and 3) third wash in 0.1X SSC.

10 The arrays were then scanned for green and red fluorescence using a Molecular Dynamics Generation III dual color laser-scanner/detector. The images were processed using BioDiscovery Autogene software, and the data from each scan set normalized to provide for a ratio of expression relative to non-tumorigenic or tumorigenic cells grown two-dimensionally or three-dimensionally. Data from the microarray experiments was analyzed
15 according to the algorithms described in U.S. application serial no. 60/252,358, filed November 20, 2000, by E.J. Moler, M.A. Boyle, and F.M. Randazzo, and entitled "Precision and accuracy in cDNA microarray data," which application is specifically incorporated herein by reference.

The experiment was repeated, this time labeling the two probes with the opposite
20 color in order to perform the assay in both "color directions." Each experiment was sometimes repeated with two more slides (one in each color direction). The level fluorescence for each sequence on the array expressed as a ratio of the geometric mean of 8 replicate spots/genes from the four arrays or 4 replicate spots/gene from 2 arrays or some other permutation. The data were normalized using the spiked positive controls present in
25 each duplicated area, and the precision of this normalization was included in the final determination of the significance of each differential. The fluorescence intensity of each spot was also compared to the negative controls in each duplicated area to determine which spots have detected significant expression levels in each sample.

A statistical analysis of the fluorescent intensities was applied to each set of duplicate
30 spots to assess the precision and significance of each differential measurement, resulting in a p-value testing the null hypothesis that there is no differential in the expression level between the tumorigenic and non-tumorigenic cells or cells grown two-dimensionally versus three-dimensionally. During initial analysis of the microarrays, the hypothesis was accepted if $p > 10^{-3}$, and the differential ratio was set to 1.000 for those spots. All other spots have a

significant difference in expression between the two samples compared. For example, if the tumorigenic sample has detectable expression and the non-tumorigenic does not, the ratio is truncated at 1000 since the value for expression in the non-tumorigenic sample would be zero, and the ratio would not be a mathematically useful value (e.g., infinity). If the non-tumorigenic sample has detectable expression and the tumorigenic does not, the ratio is truncated to 0.001, since the value for expression in the tumor sample would be zero and the ratio would not be a mathematically useful value. These latter two situations are referred to herein as "on/off." Database tables were populated using a 95% confidence level ($p > 0.05$).

In general, a polynucleotide is said to represent a significantly differentially expressed gene between two samples when there is detectable levels of expression in at least one sample and the ratio value is greater than at least about 1.2 fold, at least about 1.5 fold, or at least about 2 fold, where the ratio value is calculated using the method described above.

A differential expression ratio of 1 indicates that the expression level of the gene in tumorigenic cells was not statistically different from expression of that gene in the specific non-tumorigenic cells compared. A differential expression ratio significantly greater than 1 in tumorigenic breast cells relative to non-tumorigenic breast cells indicates that the gene is increased in expression in tumorigenic cells relative to non-tumorigenic cells, suggesting that the gene plays a role in the development of the tumorigenic phenotype, and may be involved in promoting metastasis of the cell. Detection of gene products from such genes can provide an indicator that the cell is cancerous, and may provide a therapeutic and/or diagnostic target. Likewise, a differential expression ratio significantly less than 1 in tumorigenic breast cells relative to non-tumorigenic breast cells indicates that, for example, the gene is involved in suppression of the tumorigenic phenotype. Increasing activity of the gene product encoded by such a gene, or replacing such activity, can provide the basis for chemotherapy. Such gene can also serve as markers of cancerous cells, e.g., the absence or decreased presence of the gene product in a breast cell relative to a non-tumorigenic breast cell indicates that the cell is cancerous.

Using the above methodology, three hundred and sixty-seven (367) genes or products thereof were identified from 20,000 chip clones analyzed as being overexpressed 2-fold or more in one or more of these experiments, with a p-value of 0.001 or less. These identified genes or products thereof are listed in Table 1, according to the Spot ID of the spotted polynucleotide, the Sample ID, the corresponding GenBank Accession Number (No.), the GenBank description (if available) for the corresponding Genbank Accession Number, and

the GenBank score (p-value; the probability that the association between the SEQ ID NO. and the gene or product thereof occurred by chance). The polynucleotide and polypeptide sequences, as provided by any disclosed Genbank entries are herein incorporated by reference to the corresponding Genbank accession number. The differential hybridization results from the seven differential expression microarray experiments listed above are provided in Table 2, where sequences have a measurement corresponding to its ratio of expression in the 7 experiments, e.g. spot ID 10594 is 2.2-fold overexpressed in 3D T4-2 cells as compared to 3D S1 cells. SEQ ID NOS:1-499, representing the sequences corresponding to the spot IDs listed in Tables 1 and 2 are provided in the sequence listing. Table 11 is a lookup table showing the relationship between the spot IDs (i.e. the nucleic acids spotted on the microarray) and the sequences provided in the sequence listing.

EXAMPLE 4

CYCLIN G ASSOCIATED KINASE (GAK)

A gene or product thereof called cyclin G associated kinase, or GAK, was identified as being overexpressed in 3D T4-2 cultures relative to both 3D S1 cultures (ratio: 7.9296) and 2D T4-2 cultures (ratio: 34.6682) (Sample ID RG:1056692:10012:C11, Spot ID 19990). GAK corresponds to Genbank Accession number XM_003450.

EXAMPLE 5

ANTISENSE REGULATION OF GAK EXPRESSION

Additional functional information on GAK was generated using antisense knockout technology. A number of different oligonucleotides complementary to GAK mRNA were designed (AS) with corresponding controls (RC): GGAATCACCGCTTTGCCATCTTCAA (SEQ ID NO:500; CHIR159-1AS, gak:P1868AS), AACTTCTACCGTTTCGCCACTAAGG (SEQ ID NO:501; CHIR159-1RC, gak:P1868RC); GACCGTGTACTGCGTGTCGTGCG (SEQ ID NO:502; CHIR159-7AS, gak:P0839AS) and GCGTGCTGTGCGTCATGTGCCAG (SEQ ID NO:502; CHIR159-7RC, gak:P0839RC), and tested for their ability to suppress expression of GAK in human malignant colorectal carcinoma SW620 cells, human breast cancer MDA231 cells, and human breast cancer T4-2 cells. For each transfection mixture, a carrier molecule, preferably a lipitoid or cholesterol, was prepared to a working concentration of 0.5 mM in water, sonicated to yield a uniform solution, and filtered through a 0.45 μ m PVDF membrane. The antisense or control oligonucleotide was then prepared to a working concentration of 100 μ M in sterile Millipore water. The oligonucleotide was further diluted in OptiMEM™ (Gibco/BRL), in a microfuge

tube, to 2 μ M, or approximately 20 μ g oligo/ml of OptiMEM™. In a separate microfuge tube, lipidoid or cholesteroid, typically in the amount of about 1.5-2 nmol lipidoid/ μ g antisense oligonucleotide, was diluted into the same volume of OptiMEM™ used to dilute the oligonucleotide. The diluted antisense oligonucleotide was immediately added to the
5 diluted lipidoid and mixed by pipetting up and down. Oligonucleotide was added to the cells to a final concentration of 300 nM.

The level of target mRNA (GAK) in the transfected cells was quantitated in the cancer cell lines using the methods using primers CHIR159_2896 (GCCGTCTTCAGGCAACAACCTCCCA; SEQ ID NO: 504; forward) and CHIR159_3089
10 (TGCTGGACGAGGCTGTCATCTTGC; SEQ ID NO: 505; reverse). RNA was extracted as above according to manufacturer's directions.

Quantitative PCR (qPCR) was performed by first isolating the RNA from the above mentioned tissue/cells using a Qiagen RNeasy mini prep kit. A total of 0.5 micrograms of RNA was used to generate a first strand cDNA using Stratagene MuLV Reverse
15 Transcriptase, using recommended concentrations of buffer, enzyme, and Rnasin. Concentrations and volumes of dNTP, and oligo dT, or random hexamers were lower than recommended to reduce the level of background primer dimerization in the qPCR.

The cDNA is then used for qPCR to determine the levels of expression of GAK using the GeneAmp 7000 by ABI as recommended by the manufacturer. Primers for actin were
20 also used in order to normalized the values, and eliminate possible variations in cDNA template concentrations, pipetting error, etc.

For each 20 μ l reaction, extracted RNA (generally 0.2-1 μ g total) was placed into a sterile 0.5 or 1.5 ml microcentrifuge tube, and water was added to a total volume of 12.5 μ l. To each tube was added 7.5 μ l of a buffer/enzyme mixture, prepared by mixing (in the order
25 listed) 2.5 μ l H₂O, 2.0 μ l 10X reaction buffer, 10 μ l oligo dT (20 pmol), 1.0 μ l dNTP mix (10 mM each), 0.5 μ l RNAsin® (20u) (Ambion, Inc., Hialeah, FL), and 0.5 μ l MMLV reverse transcriptase (50u) (Ambion, Inc.). The contents were mixed by pipetting up and down, and the reaction mixture was incubated at 42°C for 1 hour. The contents of each tube were centrifuged prior to amplification.

30 An amplification mixture was prepared by mixing in the following order: 1X PCR buffer II, 3 mM MgCl₂, 140 μ M each dNTP, 0.175 pmol each oligo, 1:50,000 dil of SYBR® Green, 0.25 mg/ml BSA, 1 unit *Taq* polymerase, and H₂O to 20 μ l. (PCR buffer II is available in 10X concentration from Perkin-Elmer, Norwalk, CT). In 1X concentration it contains 10 mM Tris pH 8.3 and 50 mM KCl. SYBR® Green (Molecular Probes, Eugene,

OR) is a dye which fluoresces when bound to double stranded DNA. As double stranded PCR product is produced during amplification, the fluorescence from SYBR® Green increases. To each 20 µl aliquot of amplification mixture, 2 µl of template RT was added, and amplification was carried out according to standard protocols.

- 5 Table 3 shows that the antisense oligonucleotides described above reduced expression of GAK mRNA as compared to controls in all three cell lines. GAK mRNA reduction ranged from about 50% to about 90%, as compared to cells transfected with reverse (i.e. sense) control oligonucleotides.

Table 3: antisense regulation of GAK mRNA

Oligo	Cell Line	Gene Message	Actin Message	Ratio	Percent KO
CHIR159-1AS	SW620	0.0923	0.669	0.138	90.7
CHIR159-1RC	SW620	1.01	0.680	1.49	
CHIR159-7AS	SW620	0.0555	0.678	0.082	85.4
CHIR159-7RC	SW620	0.335	0.598	0.560	
CHIR159-1AS	MDA231	0.358	0.687	0.521	59.3
CHIR159-1RC	MDA231	1.00	0.784	1.28	
CHIR159-7AS	MDA231	0.262	0.674	0.389	69.4
CHIR159-7RC	MDA231	0.840	0.659	1.27	
CHIR159-1AS	T4-2	0.307	0.707	0.434	72.9
CHIR159-1RC	T4-2	1.23	0.770	1.60	
CHIR159-7AS	T4-2	0.214	0.649	0.330	49.8
CHIR159-7RC	T4-2	0.506	0.770	0.657	

10

Reduction of GAK protein by antisense polynucleotides in SW620, MDA231 and T4-2 was confirmed using an antibody that specifically recognizes GAK. Figure 1 shows a western (i.e. protein) blot of protein extracts of the above cell lines decorated with anti-GAK antibodies. GAK protein expression is reduced in cell lines receiving GAK antisense

15 oligonucleotides.

EXAMPLE 6

ROLE OF GAK IN ANCHORAGE INDEPENDENT CELL GROWTH

The effect of GAK gene expression upon anchorage-independent cell growth of SW620 and MBA-231 cells was measured by colony formation in soft agar. Soft agar assays were performed by first coating a non-tissue culture treated plate with PolyHEMA to prevent cells from attaching to the plate. Non-transfected cells were harvested using 0.05% trypsin and washing twice in media. The cells are counted using a hemacytometer and resuspended to 10^4 per ml in media. 50 μ l aliquots are placed in poly-HEMA coated 96-well plates and transfected. For each transfection mixture, a carrier molecule, preferably a lipitoid or cholesterol, was prepared to a working concentration of 0.5 mM in water, sonicated to yield a uniform solution, and filtered through a 0.45 μ m PVDF membrane. The antisense or control oligonucleotide was then prepared to a working concentration of 100 μ M in sterile Millipore water. The oligonucleotide was further diluted in OptiMEM™ (Gibco/BRL), in a microfuge tube, to 2 μ M, or approximately 20 μ g oligo/ml of OptiMEM™. In a separate microfuge tube, lipitoid or cholesterol, typically in the amount of about 1.5-2 nmol lipitoid/ μ g antisense oligonucleotide, was diluted into the same volume of OptiMEM™ used to dilute the oligonucleotide. The diluted antisense oligonucleotide was immediately added to the diluted lipitoid and mixed by pipetting up and down. Oligonucleotide was added to the cells to a final concentration of 300 nM. Following transfection (~30 minutes), 3% GTG agarose is added to the cells for a final concentration of 0.35% agarose. After the cell layer agar solidifies, 100 μ l of media is dribbled on top of each well. Colonies form in 7 days. For a read-out of growth, 20 μ l of Alamar Blue is added to each well and the plate is shaken for 15 minutes. Fluorecence readings (530nm excitation 590 nm emission) are taken after incubation for 6-24 hours.

The data presented in Table 4 shows that the application of GAK antisense oligonucleotides to SW620 and MDA 231 cells results in inhibition of colony formation and shows that GAK plays a role in production anchorage-independent cell growth. Table 4 shows the average fluorescence reading for several experiments. The standard deviation (St. Dev) of the fluorescence reading and coefficient of variation (%CV) is also shown.

Table 4: GAK and anchorage-independent cell growth.

Oligo	Cell Line	Average	St. Dev	%CV
Blank	SW620	12868.17	208.78	1.78
Untreated	SW620	31075.17	1944.36	7.66
Pos Control	SW620	5717.17	1108.71	23.75
Neg Control	SW620	7576.17	465.95	7.63
Chir159-1AS	SW620	9701.5	2281.36	28.8
Chir159-1RC	SW620	17765.5	1958.45	13.5
Blank	MDA231	12726.83	232.45	2
Untreated	MDA231	87272.17	0	0
Pos Control	MDA231	10645.17	1591.08	18.31
Neg Control	MDA231	24159.5	2850.58	14.45
Chir159-1AS	MDA231	8613.5	4852.76	69
Chir159-1RC	MDA231	17859.17	1535.55	10.53

EXAMPLE 7

DKFZP566I133 (DKFZ)

Several previously uncharacterized genes were identified as being induced in these experiments. One such gene was represented by two spots, Spot ID Nos 22793 and 26883 (gene assignment DKFZp566I133). This gene was expressed at a ratio of about 2.2 in two 2-dimensional (2D) T4-2 vs. 2D S1 experiments, and also at a ratio of about 2 when 3-dimensional (3D) T4-2 cells were compared to the various tumor reversion cultures. However, the ratio of expression increased to an average of 3.2 when 3-dimensional (3D) T4-2 cultures were compared to 2D S1 cultures. In contrast, there was essentially no difference in expression levels when 3D S1 cultures were compared to 2D S1 cultures, suggesting that expression of this gene is specifically elevated in the tumorigenic cell line T4-2, and even further elevated when the tumorigenic cell line is grown in three dimensional cultures (see Table 5).

Table 5:

Spot	2D T4-2/	3D T42/	3D S1/	3D T4-2/	3D T4-2/	3D T4-2/	3D T4-2/
ID	2D S1	3D S1	2D S1	2D T4-2	EGFRAb	B1 integrin	Tyr
22893	1.90387	2.64711	0.522161	1	2.17956	1.75287	2.055538
26883	2.43428	3.74613	0.524466	1	2.467573	2.029468	2.002817

These array data were confirmed by qPCR using the methods described above and the gene specific PCR primers CHIR180_1207 ACAGGGAGAAAAGTGGTTGTCCTGG (SEQ ID NO:506; Forward) and CHIR180_1403 AAGGCAGAACCCATCCACTCCAA (SEQ ID NO:507; Reverse). Independent cultures were used for these experiments, and data was normalized to B-catenin. These data are shown in Table 6.

Table 6.

2D S1	2D T4-2	3D S1	3D T4-2	3D EGFR	3D B1	3D Tyr
0.165	0.421	0.14	0.475	Ab	Ab	
				0.231	0.175	0.174

DKFZ corresponds to Genbank Accession numbers NP_112200, AAH09758, and NM_030938. Orthologs of DKFZ are identified in species other than Homo sapiens include NM_138839 from *Rattus norvegicus*.

Analysis of the sequence of DKFZ using a transmembrane helix prediction algorithm (Sonhammer, et al, A hidden Markov model for predicting transmembrane helices in protein sequences, In Proc. of Sixth Int. Conf. on Intelligent Systems for Molecular Biology, p. 175-82, Ed. J. Glasgow, T. Littlejohn, F. Major, R. Lathrop, D. Sankoff, and C. Sensen, Menlo Park, CA: AAAI Press, 1998) indicates that the DKFZ protein has six transmembrane regions (Fig.2), and, as such, is likely to be a transmembrane protein.

EXAMPLE 8

ANTISENSE REGULATION OF DKFZ EXPRESSION

Additional functional information on DKFZ was generated using antisense knockout technology. A number of different oligonucleotides complementary to DKFZ mRNA were designed (AS) with corresponding controls (RC): GCTGCTGGATTCGTTTGGCATAACT (SEQ ID NO: 508; CHIR180-7AS, DKFZp56611:P1301AS),

TCAATACGGTTTGCTTAGGTCGTCG (SEQ ID NO:509; CHIR180-7RC, DKFZp566I1:P1301RC), TCTCCTCTGAGTTCAACCGCTGCT (SEQ ID NO:510; CHIR180-8AS, DKFZp566I1:P1320AS) and TCGTCGCCAACTTGAGTCTCCTCT (SEQ ID NO:511; CHIR180-8RC, DKFZp566I1:P1320AS), and tested for their ability to suppress expression of DKFZ in human malignant colorectal carcinoma SW620 cells, human breast cancer MDA231 cells, and human breast cancer T4-2 cells, as described above.

Table 7 shows that the antisense (AS) oligonucleotides described above reduced expression of DKFZ mRNA as compared to controls in all three cell lines. DKFZ mRNA reduction ranged from about 95% to about 99%, as compared to cells transfected with reverse (i.e. sense) control (RC) oligonucleotides.

Table 7: antisense regulation of DKFZ mRNA

Oligo	Cell Line	Gene Message	Actin Message	Ratio	Percent KO
CHIR180-7AS	SW620	0.0157	0.772	0.020	99.3
CHIR180-7RC	SW620	1.99	0.736	2.70	
CHIR180-8AS	SW620	0.0387	0.681	0.057	97.9
CHIR180-8RC	SW620	1.89	0.703	2.69	
CHIR180-7AS	MDA231	0.0471	3.58	0.013	98.5
CHIR180-7RC	MDA231	1.99	2.33	0.854	
CHIR180-8AS	MDA231	0.00935	1.74	0.00537	99.5
CHIR180-8RC	MDA231	1.14	1.01	1.13	
CHIR180-7AS	T4-2	0.119	0.667	0.178	95.4
CHIR180-7RC	T4-2	2.8	0.728	3.85	
CHIR180-8AS	T4-2	0.0852	0.751	0.113	95.6
CHIR180-8RC	T4-2	1.6	0.620	2.58	

EXAMPLE 9

EFFECT OF DKFZ EXPRESSION ON CELL PROLIFERATION

The effect of gene expression on the inhibition of cell proliferation was assessed in metastatic breast cancer cell line MDA-231 and breast cancer cell line T4-2.

5 Cells were plated to approximately 60-80% confluency in 96-well dishes. Antisense or reverse control oligonucleotide was diluted to 2 μ M in OptiMEM™ and added to OptiMEM™ into which a delivery vehicle, preferably a lipitoid or cholesterol, had been diluted. The oligo/delivery vehicle mixture was then further diluted into medium with serum on the cells. The final concentration of oligonucleotide for all experiments was 300 nM, and
10 the final ratio of oligo to delivery vehicle for all experiments was 1.5 nmol lipitoid/ μ g oligonucleotide.

Antisense oligonucleotides were prepared. Cells were transfected for 4 hours or overnight at 37°C and the transfection mixture was replaced with fresh medium. Plates are incubated for 4 days, with a plate harvested for each day0-day4. To determine differences in
15 cell number, a CyQuant Cell Proliferation Assay kit (Molecular Probes) was used per manufacturer's instructions. Fluorecence readings (480nm excitation 520 nm emission) are taken after incubation for 5 minutes.

The results of these assays are shown in Tables 7A and 8. The data show that DKFZ antisense polynucleotides significantly reduce cell proliferation as compared to controls,
20 and, as such, DKFZ plays a role in production or maintenance of the cancerous phenotype in cancerous breast cells.

Table 7A:

Cell proliferation

Oligo	Cell Line	Ave Day0	Ave Day1	Ave Day2	Av3 Day3	Ave Day4
Untreated	MDA231	4233	4858	9544	10981	16776
Untreated	MDA231	3849	4036	8686	9855	14865
Pos Control	MDA231	3630	2236	3564	4536	7477
Neg Control	MDA231	4913	5127	8331	8887	13620
CHIR180-7AS	MDA231	3848	3476	6942	8715	11925
CHIR180-7RC	MDA231	4895	4700	8484	10318	14226
Untreated	T4-2	4062	3389	5438	10579	15617
Untreated	T4-2	4209	3802	6346	11802	16275
Pos Control	T4-2	3985	2712	4081	6404	9685
Neg Control	T4-2	4051	3901	4356	9425	12964
CHIR180-7AS	T4-2	3792	3201	3849	7376	10911
CHIR180-7RC	T4-2	3967	3840	4321	8382	12293

Table 8

Oligo	Standard Deviations					P-Value of T-Test				
	Day 0	Day 1	Day 2	Day 3	Day 4	Day0	Day1	Day2	Day3	Day4
Untreated	337	269	299	697	1333	0.1306	0.1063	0.1804	0.0926	0.1225
Untreated	99	631	867	547	1047	0.1306	0.1063	0.1804	0.0926	0.1225
Pos Control	94	118	89	441	974	0.0000	0.0001	0.0003	0.0001	0.0010
Neg Control	2	252	697	195	780	0.0000	0.0001	0.0003	0.0001	0.0010
CHIR180-7 AS	292	16	435	398	418	0.0072	0.0276	0.0059	0.0140	0.0028
CHIR180-7 RC	208	6	244	533	440	0.0072	0.0276	0.0059	0.0140	0.0028
Untreated	64	283	789	1593	1226	0.2550	0.0921	0.1257	0.2794	0.4352
Untreated	22	158	205	577	478	0.2550	0.0921	0.1257	0.2794	0.4352
Pos Control	122	213	6	475	957	0.4320	0.0065	0.2624	0.0051	0.0293
Neg Control	47	335	464	809	1417	0.4320	0.0065	0.2624	0.0051	0.0293
CHIR180-7 AS	170	679	263	127	1330	0.2638	0.0976	0.3516	0.0040	0.0039
CHIR180-7 RC	22	453	646	579	884	0.2638	0.0976	0.3516	0.0040	0.0039

EXAMPLE 10

5

ROLE OF DKFZ IN ANCHORAGE INDEPENDENT CELL GROWTH

The effect of DKFZ gene expression upon anchorage-independent cell growth of MDA435 and MCF7 human breast cancer cells was measured by colony formation in soft agar. Soft agar assays were conducted by the method described for GAK, above.

The data presented in Table 9 shows that the application of DKFZ antisense oligonucleotides to MDA435 and MCF7 cells results in inhibition of colony formation and shows that DKFZ plays a role in anchorage-independent cell growth of cancer cells. Table 9 shows the average fluorescence reading for several experiments. The standard deviation (St. Dev) of the fluorescence reading and coefficient of variation (%CV) and probability (P-value) is also shown.

Table 9

Oligo	Cell Line	Average	St. Dev	%CV	P-Value
Untreated	MDA435	31190	5838	19	0.1342
Untreated	MDA435	38623	3620	9	0.1342
Pos Control	MDA435	4776	818	17	0.0156
Neg Control	MDA435	16315	481	3	0.0156
Chir180-7AS	MDA435	21161	3439	16	0.0274
Chir180-7RC	MDA435	28868	1902	7	0.0274
Untreated	MCF7	18954	1478	8	0.1476
Untreated	MCF7	14383	4163	29	0.1476
Pos Control	MCF7	1036	194	19	0.0036
Neg Control	MCF7	9478	2382	25	0.0036
Chir180-7AS	MCF7	4752	2002	42	0.0139
Chir180-7RC	MCF7	9570	18	0	0.0139

The effect of DKFZ gene expression upon invasiveness of MDA231 human breast cancer cells was measured by a matrigel assay. A 3-dimensional reconstituted basement membrane culture of cells was generated as described previously (Peterson et al., (1992) *Proc. Natl. Acad. Sci. USA* 89:9064-9068) using a commercially prepared reconstituted basement membrane (Matrigel; Collaborative Research, Waltham, MA) and examined using methods well known in the art.

Table 10 (quantitated using Alamar Blue similar to the soft agar assay) and Figure 3 provides exemplary results of the Matrigel invasion/motility assay to test the invasiveness of

MDA231 cells with reduced expression of DKFZ. In general, these data show that a reduction in the expression of DKFZ significantly decreases the invasiveness of MDA231 cells.

Table 10:

Oligo	Cell Line	Average	St. Dev	%CV	P-Value
Untreated	MDA231	28316	13663	48	0.9080
Untreated	MDA231	26840	15669	58	0.9080
Pos Control	MDA231	2756	487	18	0.0002
Neg Control	MDA231	14301	1386	10	0.0002
Chir180-7AS	MDA231	10508	1963	19	0.0287
Chir180-7RC	MDA231	14310	153	1	0.0287

EXAMPLE 11

EXPRESSION OF DKFZ IN CANCER TISSUES

The following peptides were used for polyclonal antibody production: peptide 809: gvhqqyvqriek (SEQ ID NO:380), corresponding to amino acids 97-108 of the DKFZ protein and peptide 810: sgaepddeeyqef (SEQ ID NO:381), corresponding to amino acids 215-227 of the DKFZ protein.

Antibodies specific for DKFZ are used in FACS and immunolocalization analysis to show that DKFZ is associated with membrane, and up-regulated in cancer tissues of biopsies from cancer patients.

Further, antibodies specific for DKFZ are used to modulate DKFZ activity in cancerous breast, and is further used, alone or conjugated to a toxic moiety, as a treatment for breast cancer.

While the present invention has been described with reference to the specific embodiments thereof, it should be understood by those skilled in the art that various changes may be made and equivalents may be substituted without departing from the true spirit and scope of the invention. In addition, many modifications may be made to adapt a particular situation, material, composition of matter, process, process step or steps, to the objective, spirit and scope of the present invention. All such modifications are intended to be within the scope of the claims appended hereto

Table 1

SPOTID	SAMPLE ID	GENBANK NO	GENBANK DESCRIPTION	GENBANK SCORE
10594	I:1871362:05B01:A04	M62994 *	Homo sapiens thyroid autoantigen (truncated actin-binding protein) mRNA, complete cds	8.6E-36
21851	M00055153A:A12			
20990	I:1986550:13B02:G12	XM 005667	Homo sapiens lipocalin 2 (oncogene 24p3) (LCN2), mRNA	0
18641	I:3473302:09A01:A09	AB046098	Macaca fascicularis brain cDNA, clone:QccE-15843	5.8E-57
17229	I:1506962:09A01:G01	AL365454	Homo sapiens mRNA full length insert cDNA clone EUROIMAGE 926491	2.6E-110
25930	035JN020.F01	AJ010446	Homo sapiens mRNA for immunoglobulin kappa light chain, anti-RhD, therad 24	0
20701	RG:730349:10010:G12	U28387	Human hexokinase II pseudogene, complete cds	0
20346	RG:1839794:10015:E11	U28387	Human hexokinase II pseudogene, complete cds	0
21247	M00054680C:A06	U28387	Human hexokinase II pseudogene, complete cds	9.9E-80
23062	M00056353C:E10	XM 011013	Homo sapiens filamin B, beta (actin-binding protein-278) (FLNB), mRNA	0
25666	035Jn031.B01	AF191633	Homo sapiens filamin (FLNB) gene, exon 48 and complete cds	0
19001	I:2171401:09A02:E09	AF123887	Homo sapiens ERO1L (ERO1L) mRNA, partial cds	3.3E-104
10897	I:1852047:02A01:A10	U22384	Human lysyl oxidase gene, partial cds	0
1960	M00023297B:A10	M33376	Human pseudo-chlordecone reductase mRNA, complete cds	0
26381	035JN029.H02	AB037838	Homo sapiens mRNA for KIAA1417 protein, partial cds	0
26719	035JN030.A02	X68277	H. sapiens CL 100 mRNA for protein tyrosine phosphatase	0
27152	037XN007.A09	XM 048479	Homo sapiens hypothetical protein FLJ14642 (FLJ14642), mRNA	7.3E-58
10926	I:2047770:08B02:G04	AK000969	Homo sapiens cDNA FLJ10107 fis, clone HEMBA1002583	3.8E-94
28980	035JN003.C12	XM 027456	Homo sapiens hypothetical gene supported by AK000584 (LOC89942), mRNA	0
1236	M00022024A:F02			
29350	035JN008.D06	XM 043864	Homo sapiens phosphoinositide-3-kinase, regulatory subunit, polypeptide 1 (p85 alpha) (PIK3R1), mRNA	0
26242	035JN015.B02	AL137717	Homo sapiens mRNA; cDNA DKFZp434J1630 (from clone DKFZp434J1630)	2.6E-70
4098	M00001439D:C09	BC002446	Homo sapiens, MRJ gene for a member of the DNAJ protein family, clone MGC:1152 IMAGE:3346070, mRNA, complete cds	0
17432	I:1965049:16B02:D07	XM 051165	Homo sapiens DKFZP586A0522 protein (DKFZP586A0522), mRNA	0
1785	SL198	XM 051165	Homo sapiens DKFZP586A0522 protein (DKFZP586A0522), mRNA	0
28856	035JN032.E11	X62996	H. sapiens mitochondrial genome (consensus sequence)	0
18791	RG:229957:10007:D03	D42042	Human mRNA for KIAA0085 gene, partial cds	0
22950	M00056922C:C09			
1882	M00022196B:D09	Z29083	H. sapiens 5T4 gene for 5T4 Oncofetal antigen	0
23886	M00055408A:F10			
24995	M00055215C:E11	XM 012880	Homo sapiens hypothetical protein MGC1936 (MGC1936), mRNA	0
24477	M00055510B:F08	AF240697	Homo sapiens retinol dehydrogenase homolog isoform-2 (RDH) mRNA, complete cds	0

Table 1

SPOTID	SAMPLE ID	GENBANK NO	GENBANK DESCRIPTION	GENBANK SCORE
21681	M00056771C:A12	X02152	Human mRNA for lactate dehydrogenase-A (LDH-A, EC 1.1.1.27)	0
9557	I:1335140:05A02:C08	X02152	Human mRNA for lactate dehydrogenase-A (LDH-A, EC 1.1.1.27)	0
22033	M00056574B:A07			
873	M00007979C:C05	X00663	Human mRNA fragment for epidermal growth factor (EGF) receptor	0
17144	RG:25254:10004:D07	M97675	Human transmembrane receptor (ror1) mRNA, complete cds	0
26970	035JN015.F09	AF097514	Homo sapiens stearyl-CoA desaturase (SCD) mRNA, complete cds	0
21402	M00054507C:D07			
27074	035Jn031.B03	AF061741	Homo sapiens retinal short-chain dehydrogenase/reductase retSDR1 mRNA, complete cds	0
10963	I:1258790:05A02:B10	AF072752	Homo sapiens ten integrin EGF-like repeat domains protein precursor (ITGBL1) mRNA, complete cds	0
29525	035JN026.D12			
25514	035JN011.F01	U62961	Human succinyl CoA:3-oxoacid CoA transferase precursor (OXCT) mRNA, complete cds	0
26612	035JN016.C08	NM_000240	Homo sapiens monoamine oxidase A (MAOA), nuclear gene encoding mitochondrial protein, mRNA	0
24600	M00055490C:G11	U57059	Homo sapiens Apo-2 ligand mRNA, complete cds	0
9741	I:3126828:12A02:G02	U37518	Human TNF-related apoptosis inducing ligand TRAIL mRNA, complete cds	0
23689	M00054752A:E11	XM_001468	Homo sapiens S100 calcium-binding protein A10 (annexin II ligand, calpactin I, light polypeptide (p11)) (S100A10), mRNA	0
22352	M00042842B:E02	XM_001468	Homo sapiens S100 calcium-binding protein A10 (annexin II ligand, calpactin I, light polypeptide (p11)) (S100A10), mRNA	0
23806	RG:2007319:20003:G10			
12285	I:1404669:04A01:G12	BC002517	Homo sapiens, Pirin, clone MGC:2083 IMAGE:3140037, mRNA, complete cds	0
27638	035JN011.D10	AK002155	Homo sapiens cDNA FLJ11293 fis, clone PLACE1009670, highly similar to Homo sapiens genethonin 1 mRNA	0
9663	I:2488567:11A02:H08	XM_006027	Homo sapiens brain-derived neurotrophic factor (BDNF), mRNA	0
26850	035JN003.B03	XM_031551	Homo sapiens similar to carbohydrate (N-acetylglucosamine-6-O) sulfotransferase 2 (H. sapiens) (LOC90414), mRNA	0
10204	I:1491445:02B01:F09	AF131765	Homo sapiens clone 24833 nonsyndromic hearing impairment protein mRNA sequence, complete cds	0
1318	2192-6			
25922	035JN020.B01	AB020673	Homo sapiens mRNA for KIAA0866 protein, complete cds	0
26347	035JN025.G02			
20361	I:395116:17A02:E05			
28672	035JN012.A05	AF126181	Homo sapiens breast cancer-associated gene 1 protein (BCG1) mRNA, complete cds	0
25520	035JN011.A07	D86956	Human mRNA for KIAA0201 gene, complete cds	0
1723	M00005694A:A09	BC001980	Homo sapiens, clone IMAGE:3462291, mRNA	0

Table 1

SPOTID	SAMPLE ID	GENBANK NO	GENBANK DESCRIPTION	GENBANK SCORE
28863	037XN002.A05			
25526	035JN011.D07	AF086281	Homo sapiens full length insert cDNA clone ZD45G11	0
27936	035JN008.A04	X59445	H.sapiens mRNA for colon carcinoma Manganese Superoxide Dismutase	0
26851	035JN001.C03	XM 033944	Homo sapiens superoxide dismutase 2, mitochondrial (SOD2), mRNA	0
25107	M00054825A:E04	AF075061	Homo sapiens full length insert cDNA YP07G10	0
24912	M00054505D:D06	AF075061	Homo sapiens full length insert cDNA YP07G10	0
25169	M00055510D:D04	M11167	Human 28S ribosomal RNA gene	1.2E-76
25600	035JN023.A01	BC003107	Homo sapiens, inhibitor of DNA binding 3, dominant negative helix-loop-helix protein, clone MGC:1988 IMAGE:3543936, mRNA, complete	0
28706	035JN016.B05	X55181	Human ETS2 gene, 3'end	0
26377	035JN029.F02	Y14436	Homo sapiens mRNA for phosphatidic acid phosphatase type 2	0
19460	I:438655:14B02:B04	AF007133	Homo sapiens clone 23764 mRNA sequence	4.5E-113
25243	RG:1667183:10014:F12	BC000013	Homo sapiens, insulin-like growth factor binding protein 3, clone MGC:2305 IMAGE:3506666, mRNA, complete cds	0
20018	I:1213574:17B01:A11	AB037925	Homo sapiens MAIL mRNA, complete cds	3.7E-106
918	M00026895D:H03	BC006433	Homo sapiens, Ras-related GTP-binding protein, clone MGC:13077 IMAGE:3835186, mRNA, complete cds	0
25027	RG:1983823:20002:B06			
29089	035JN017.B06	XM 037534	Homo sapiens phosphodiesterase 7A (PDE7A), mRNA	0
9141	I:1347384:02A02:C07	U78579	Human type I phosphatidylinositol-4-phosphate 5-kinase beta (STM7) mRNA, partial cds	0
12005	I:1259230:05A01:C06	D87075	Human mRNA for KIAA0238 gene, partial cds	0
12148	I:3360476:03B01:B12	XM 040922	Homo sapiens interleukin 13 receptor, alpha 2 (IL13RA2), mRNA	0
17394	RG:1943755:10016:A07	AF346607	Homo sapiens interleukin-1 receptor associated kinase 1b (IRAK) mRNA, complete cds, alternatively spliced	0
27017	035JN021.F03	XM 051742	Homo sapiens spermine synthase (SMS), mRNA	0
25809	035JN002.B07	XM 009699	Homo sapiens nuclear receptor interacting protein 1 (NRIP1), mRNA	0
8719	I:2600080:10A01:H01	XM 009665	Homo sapiens Kreisler (mouse) maf-related leucine zipper homolog (KRML), mRNA	0
21030	RG:1714832:10015:C06	XM 029957	Homo sapiens Rab acceptor 1 (prenylated) (RABAC1), mRNA	0
11436	I:1470085:03B01:F05	XM 038976	Homo sapiens N-ethylmaleimide-sensitive factor attachment protein, alpha (NAPA), mRNA	0
10374	I:1513989:03B02:C03	XM 009010	Homo sapiens complement component 3 (C3), mRNA	1.4E-96
19037	I:417827:15A01:G10	X79538	H.sapiens nuk_34 mRNA for translation initiation factor	1.9E-28
398	M00027016A:C05	XM 031470	Homo sapiens aldolase C, fructose-bisphosphate (ALDOC), mRNA	4E-62
18773	I:1211682:14A02:C09	XM 008477	Homo sapiens aldolase C, fructose-bisphosphate (ALDOC), mRNA	0
3583	M00023407B:C10			
3418	M00001470A:C03	XM 043951	Homo sapiens CDP-diacylglycerol--inositol 3-phosphatidyltransferase (phosphatidylinositol synthase) (CDIPT), mRNA	0

Table 1

SPOTID	SAMPLE ID	GENBANK NO	GENBANK DESCRIPTION	GENBANK SCORE
18985	I:1402615:09A02:E03	AF191148	Homo sapiens type I transmembrane protein Fn14 mRNA, complete cds	7.9E-64
25861	035JN010.D01	XM_047975	Homo sapiens hydroxyacyl glutathione hydrolase (HAGH), mRNA	0
3317	M00003974D:E04	AF136185	Homo sapiens collagen type XVII (COL17A1) gene, 3' UTR, long form	0
8743	I:1858905:04A01:D01	U36775	Human ribonuclease 4 gene, partial cds	2.1E-57
26240	035JN015.A02	XM_007493	Homo sapiens ribonuclease, RNase A family, 4 (RNASE4), mRNA	0
28562	037XN007.B11	X00947	Human alpha 1-antichymotrypsin gene fragment	0
16877	I:2362945:15A01:C07	XM_029378	Homo sapiens checkpoint suppressor 1 (CHES1), mRNA	1.9E-91
25955	035JN022.C01	AF035620	Homo sapiens BRCA1-associated protein 2 (BRAP2) mRNA, complete cds	0
26308	035JN023.C02	XM_041470	Homo sapiens zinc finger protein 145 (Kruppel-like, expressed in promyelocytic leukemia) (ZNF145), mRNA	0
4140	2239-4	X03083	Human lactate dehydrogenase-A gene exon 7 and 3' flanking region	0
3436	2239-1	X03083	Human lactate dehydrogenase-A gene exon 7 and 3' flanking region	0
25612	035JN023.G01	M94856	Human fatty acid binding protein homologue (PA-FABP) mRNA, complete cds	0
12257	I:1448135:04A01:A06	X15535	H.sapiens lysosomal acid phosphatase gene (EC 3.1.3.2) Exon 11	0
9111	I:1958902:04A02:D07	D87258	Homo sapiens mRNA for serin protease with IGF-binding motif, complete cds	0
17620	I:875567:15B01:B08	XM_045326	Homo sapiens MAX-interacting protein 1 (MXI1), mRNA	0
26025	035JN030.F01	XM_032511	Homo sapiens procollagen-proline, 2-oxoglutarate 4-dioxygenase (proline 4-hydroxylase), alpha polypeptide I (P4HA1), mRNA	0
19271	RG:686684:10010:D04	AF005216	Homo sapiens receptor-associated tyrosine kinase (JAK2) mRNA, complete cds	0
4151	2035-1	D87953	Human mRNA for RTP, complete cds	0
26569	035JN010.F02	AB004788	Homo sapiens mRNA for BNIP3L, complete cds	0
10344	I:2859338:11B02:D03	XM_005052	Homo sapiens angiopoietin 1 (ANGPT1), mRNA	1.3E-97
832	M00021649B:D05	XM_004628	Homo sapiens hypoxia-inducible protein 2 (HIG2), mRNA	0
12071	I:1798283:06A01:D06	S72481	pantophysin [human, keratinocyte line HaCaT, mRNA, 2106 nt]	0
12271	I:1445767:04A01:H06	X12701	H.sapiens mRNA for endothelial plasminogen activator inhibitor PAI	1.8E-130
11433	I:1526282:03A01:E05	XM_033627	Homo sapiens glycoprotein (transmembrane) nmb (GPNMB), mRNA	3.7E-117
20917	RG:222350:10007:C12	X00663	Human mRNA fragment for epidermal growth factor (EGF) receptor	1.7E-122
25810	035JN004.B07	X00588	Human mRNA for precursor of epidermal growth factor receptor	0
12039	I:3506985:07A01:D06	M24795	Human CD36 antigen mRNA, complete cds	0
25499	035JN005.G07	XM_028224	Homo sapiens N-acetylglucosamine-phosphate mutase (AGM1), mRNA	0
25557	035JN013.D07	BC010135	Homo sapiens, cyclin C, clone IMAGE:4106819, mRNA	0
9917	I:1283532:05A01:G09	XM_004148	Homo sapiens 5T4 oncofetal trophoblast glycoprotein (5T4), mRNA	2.4E-70

Table 1

SPOTID	SAMPLE ID	GENBANK NO	GENBANK DESCRIPTION	GENBANK SCORE
19505	RG:204653:10007:A10	XM_003789	Homo sapiens colony stimulating factor 1 receptor, formerly McDonough feline sarcoma viral (v-fms) oncogene homolog (CSF1R), mRNA	0
17491	RG:277866:10008:B07	XM_003789	Homo sapiens colony stimulating factor 1 receptor, formerly McDonough feline sarcoma viral (v-fms) oncogene homolog (CSF1R), mRNA	0
10683	I:1686726:06A01:F10	XM_003789	Homo sapiens colony stimulating factor 1 receptor, formerly McDonough feline sarcoma viral (v-fms) oncogene homolog (CSF1R), mRNA	0
1936	M00008020C:H09	X68277	H.sapiens CL 100 mRNA for protein tyrosine phosphatase	0
828	M00021638B:F03	X68277	H.sapiens CL 100 mRNA for protein tyrosine phosphatase	0
9558	I:1824443:05B02:C08	XM_003708	Homo sapiens gamma-aminobutyric acid (GABA) A receptor, pi (GABRP), mRNA	0
20164	I:1997963:14B02:B05	XM_003631	Homo sapiens solute carrier family 25 (mitochondrial carrier; adenine nucleotide translocator), member 4 (SLC25A4), mRNA	0
969	NIH50_40026	BC008664	Homo sapiens, clone MGC:9281 IMAGE:3871960, mRNA, complete cds	0
9910	I:1805840:05B01:C09	XM_003399	Homo sapiens mannosidase, beta A, lysosomal (MANBA), mRNA	0
2427	M00005767D:B03	XM_047441	Homo sapiens RAP1, GTP-GDP dissociation stimulator 1 (RAP1GDS1), mRNA	0
19990	RG:1056692:10012:C11	XM_003450	Homo sapiens cyclin G associated kinase (GAK), mRNA	0
20605	I:690313:16A01:G12	XM_011152	Homo sapiens insulin-like growth factor binding protein 7 (IGFBP7), mRNA	0
10650	I:2456393:07B01:E10	AK001580	Homo sapiens cDNA FLJ10718 fis, clone NT2RP3001096, weakly similar to Rattus norvegicus leprecan mRNA	0
25963	035JN022.G01	X53002	Human mRNA for integrin beta-5 subunit	0
25562	035JN015.F07	X53002	Human mRNA for integrin beta-5 subunit	0
9377	I:2782593:12A01:A02	X60656	H.sapiens mRNA for elongation factor 1-beta	1.4E-46
17618	I:707667:15B01:A08	XM_002273	Homo sapiens inhibitor of DNA binding 2, dominant negative helix-loop-helix protein (ID2), mRNA	3.5E-117
12136	I:3208994:03B01:D06	U16267	Human AMP deaminase, isoform L, alternatively spliced (AMPD2) mRNA, exons 1A, 2 and 3, partial cds	0
17373	I:1538189:14A02:G07	XM_046818	Homo sapiens similar to receptor tyrosine kinase-like orphan receptor 1 (H. sapiens) (LOC92711), mRNA	8.3E-123
18577	RG:503209:10010:A09	XM_049305	Homo sapiens Lysosomal-associated multispanning membrane protein-5 (LAPTM5), mRNA	0
3143	M00001605D:C02	BC003107	Homo sapiens, inhibitor of DNA binding 3, dominant negative helix-loop-helix protein, clone MGC:1988 IMAGE:3543936, mRNA, complete	1.7E-88
17737	RG:155066:10006:E02	AL050147	Homo sapiens mRNA; cDNA DKFZp586E0820 (from clone DKFZp586E0820); partial cds	0
20029	I:1923613:17A01:G11	AF113123	Homo sapiens carbonyl reductase mRNA, complete cds	0
18537	NIH50_40304	BC001380	Homo sapiens, succinate dehydrogenase complex, subunit A, flavoprotein (Fp), clone MGC:1484 IMAGE:3051442, mRNA, complete cds	0

Table 1

SPOTID	SAMPLE ID	GENBANK NO	GENBANK DESCRIPTION	GENBANK SCORE
10090	NIH50_40304			
12102	I:2832414:11B01:C06	XM_048045	Homo sapiens katanin p80 (WD40-containing) subunit B 1 (KATNB1), mRNA	0
8487	I:1375115:05A01:D01	BC001174	Homo sapiens, exostoses (multiple) 1, clone MGC:2129 IMAGE:3502232, mRNA, complete cds	0
9252	I:1673876:06B01:B02	BC000917	Homo sapiens, clone MGC:5184 IMAGE:3048750, mRNA, complete cds	0
25605	035JN021.D01	BC000671	Homo sapiens, claudin 4, clone MGC:1778 IMAGE:3349211, mRNA, complete cds	0
29652	M00001610C:D05	BC000588	Homo sapiens, HIRA-interacting protein 3, clone MGC:1814 IMAGE:3345739, mRNA, complete cds	0
10858	I:2458933:04B01:E04	X97544	H.sapiens mRNA for TIM17 preprotein translocase	8.7E-62
1261	M00023419C:B06	U89606	Human pyridoxal kinase mRNA, complete cds	0
4156	2243-4	X93334	Homo sapiens mitochondrial DNA, complete genome	0
3452	2243-1	X93334	Homo sapiens mitochondrial DNA, complete genome	0
2748	2242-6	X93334	Homo sapiens mitochondrial DNA, complete genome	0
2046	2248-3	X93334	Homo sapiens mitochondrial DNA, complete genome	0
2044	2242-4	X93334	Homo sapiens mitochondrial DNA, complete genome	0
1342	2248-2	X93334	Homo sapiens mitochondrial DNA, complete genome	0
1326	2244-3	X93334	Homo sapiens mitochondrial DNA, complete genome	0
9981	I:1720149:06A01:G09	AF069604	Homo sapiens myosin light chain kinase isoform 4 (MLCK) mRNA, partial cds	0
27917	035JN002.H04	XM_015978	Homo sapiens hypothetical protein FLJ22969 (FLJ22969), mRNA	1.8E-92
8488	I:1808529:05B01:D01	AJ293647	Homo sapiens partial IL4RA gene for interleukin-4 receptor alfa chain, exon 11, ECSSQV allele	1.1E-125
22793	M00057283C:D06	AF161410	Homo sapiens HSPC292 mRNA, partial cds	0
26883	035JN005.C03	AF161410	Homo sapiens HSPC292 mRNA, partial cds	0
11540	I:1909488:10B01:B11	XM_027739	Homo sapiens duodenal cytochrome b (FLJ23462), mRNA	0
17707	I:489882:14A01:F02	X99474	H.sapiens mRNA for chloride channel, CIC-6c	0
20649	NIH50_41452	Z14136	H.sapiens gene for spermidine/spermine N1-acetyltransferase	0
24004	M00056163C:H09	AF107495	Homo sapiens FWP001 and putative FWP002 mRNA, complete cds	0
11836	I:1806769:01B02:F11	X93036	H.sapiens mRNA for MAT8 protein	0
24932	M00054963C:C09	M26152	Homo sapiens serum amyloid A (SAA) mRNA, complete cds	0
19143	RG:149960:10006:D04	AK003448	Mus musculus 18 days embryo cDNA, RIKEN full-length enriched library, clone:1110004P15, full insert sequence	8.9E-21
26257	035JN013.B08	J04056	Human carbonyl reductase mRNA, complete cds	0
21239	M00054679B:B03	J02619	Human Z type alpha-1-antitrypsin gene, complete cds (exons 2-5)	0
16959	I:1426031:14B01:B07	AY035783	Homo sapiens laminin 5 beta 3 subunit (LAMB3) mRNA, complete cds	3.8E-121

Table 1

SPOTID	SAMPLE ID	GENBANK NO	GENBANK DESCRIPTION	GENBANK SCORE
2568	M00022158D:C11	<u>XM_036609</u>	Homo sapiens laminin, beta 3 (nicein (125kD), kalinin (140kD), BM600 (125kD)) (LAMB3), mRNA	0
25936	035JN020.A07	<u>XM_036608</u>	Homo sapiens laminin, beta 3 (nicein (125kD), kalinin (140kD), BM600 (125kD)) (LAMB3), mRNA	0
23041	M00054797C:G10	<u>XM_046649</u>	Homo sapiens nuclear factor of kappa light polypeptide gene enhancer in B-cells inhibitor, alpha (NFKBIA), mRNA	0
9206	I:1822716:05B01:C08	<u>BC008059</u>	Homo sapiens, clone IMAGE:2967491, mRNA	0
25105	M00054824C:H04	<u>BC009110</u>	Homo sapiens, clone MGC:17355 IMAGE:3453825, mRNA, complete cds	0
24779	M00057061D:G07			
22451	M00043372B:B06	<u>X00947</u>	Human alpha 1-antichymotrypsin gene fragment	0
22291	M00054785D:G05	<u>X00947</u>	Human alpha 1-antichymotrypsin gene fragment	0
21143	M00055146A:D11			
24751	M00054676B:D07	<u>X03083</u>	Human lactate dehydrogenase-A gene exon 7 and 3' flanking region	0
24294	M00056163D:E01	<u>X03083</u>	Human lactate dehydrogenase-A gene exon 7 and 3' flanking region	9.4E-110
24006	M00056163D:E01	<u>X03083</u>	Human lactate dehydrogenase-A gene exon 7 and 3' flanking region	0
25678	035Jn031.H01	<u>AK001670</u>	Homo sapiens cDNA FLJ10808 fis, clone NT2RP4000879, weakly similar to UBIQUITIN-ACTIVATING ENZYME E1	4.9E-53
22027	M00056534C:E08	<u>XM_003512</u>	Homo sapiens amphiregulin (schwannoma-derived growth factor) (AREG), mRNA	0
29495	035JN022.E12	<u>D83761</u>	Homo sapiens mRNA for mother against dpp (Mad) related protein, complete cds	0
24577	M00056654B:G02	<u>XM_038306</u>	Homo sapiens dual specificity phosphatase 6 (DUSP6), mRNA	0
23527	M00055865C:D04			
17090	I:341491:13B01:A01	<u>BC004490</u>	Homo sapiens, v-fos FBJ murine osteosarcoma viral oncogene homolog, clone MGC:11074 IMAGE:3688670, mRNA, complete cds	3.8E-98
25137	M00057167A:C07			
23772	M00056360A:E07	<u>BC004490</u>	Homo sapiens, v-fos FBJ murine osteosarcoma viral oncogene homolog, clone MGC:11074 IMAGE:3688670, mRNA, complete cds	0
1659	M00001350B:D10	<u>BC004490</u>	Homo sapiens, v-fos FBJ murine osteosarcoma viral oncogene homolog, clone MGC:11074 IMAGE:3688670, mRNA, complete cds	0
8497	I:2170638:05A01:A07	<u>BC006169</u>	Homo sapiens, Similar to SH3-domain binding protein 5 (BTK-associated), clone MGC:13234 IMAGE:4025362, mRNA, complete cds	5.2E-125
25272	M00054621A:D09	<u>AF161435</u>	Homo sapiens HSPC317 mRNA, partial cds	0
21216	M00056194B:G06	<u>XM_002844</u>	Homo sapiens procollagen-lysine, 2-oxoglutarate 5-dioxygenase (lysine hydroxylase) 2 (PLOD2), mRNA	0
11939	I:2938757:02A02:B05	<u>D43767</u>	Human mRNA for chemokine, complete cds	0
9191	I:1421929:05A01:D02	<u>X63629</u>	H.sapiens mRNA for p cadherin	2.4E-90
3429	2024-3	<u>AF002697</u>	Homo sapiens E1B 19K/Bcl-2-binding protein Nip3 mRNA, nuclear gene encoding mitochondrial protein, complete cds	0
2725	2024-1	<u>AF002697</u>	Homo sapiens E1B 19K/Bcl-2-binding protein Nip3 mRNA, nuclear gene encoding mitochondrial protein, complete cds	0

Table 1

SPOTID	SAMPLE ID	GENBANK NO	GENBANK DESCRIPTION	GENBANK SCORE
19923	I:1001356:13A01:B11	BC006318	Homo sapiens, erythrocyte membrane protein band: 4.9 (dematin), clone MGC:12740 IMAGE:4125804, mRNA, complete cds	1.7E-103
20457	I:1923289:19A01:E06	XM_035603	Homo sapiens gap junction protein, beta 5 (connexin 31.1) (GJB5), mRNA	0
24773	M00057055D:B11			
24119	M00042886D:H10	BC006260	Homo sapiens, Similar to N-myc downstream regulated, clone MGC:11293 IMAGE:3946764, mRNA, complete cds	4.4E-114
3908	M00027080A:E06	M60756	Human histone H2B.1 mRNA, 3' end	0
8560	I:2346704:06B01:H01	AJ000334	Homo sapiens mRNA for cytosolic asparaginyl-tRNA synthetase	0
24588	M00055411A:C10	L19779	Homo sapiens histone H2A.2 mRNA, complete cds	0
4047	M00007997C:B08	XM_009091	Homo sapiens glycogen synthase 1 (muscle) (GYS1), mRNA	0
28344	035JN011.E11	XM_050471	Homo sapiens glycogen synthase 1 (muscle) (GYS1), mRNA	0
27561	035JN001.F04	XM_001472	Homo sapiens v-jun avian sarcoma virus 17 oncogene homolog (JUN), mRNA	0
3272	M00022165C:E12	NM_001024	Homo sapiens ribosomal protein S21 (RPS21), mRNA	0
26735	035JN030.A08	XM_010408	Homo sapiens RAB9-like protein (RAB9L), mRNA	0
24900	M00054500D:C08	BC004427	Homo sapiens, proteasome (prosome, macropain) subunit, alpha type, 7, clone MGC:3755 IMAGE:2819923, mRNA, complete cds	0
9472	I:2510171:04B01:H08	X04503	Human SLPI mRNA fragment for secretory leucocyte protease inhibitor	0
9979	I:1623318:06A01:F09	L31409	Homo sapiens creatine transporter mRNA, complete cds	2.2E-45
21996	M00042467B:B04	L00160	Human phosphoglycerate kinase (pgk) mRNA, exons 2 to last	0
22312	M00055035D:F05			
11327	I:3139773:05A01:H11	L00160	Human phosphoglycerate kinase (pgk) mRNA, exons 2 to last	2.6E-21
18240	RG:1927470:10015:H08	V00572	Human mRNA encoding phosphoglycerate kinase	0
21922	M00054848A:D12	AF139065	Homo sapiens desmoplakin I mRNA, partial cds	0
22290	M00057002D:H01			
10390	I:1405391:03B02:C09	AF056979	Homo sapiens clone YAN1 interferon-gamma receptor mRNA, complete cds	0
2212	M00008098B:F06	U19247	Homo sapiens interferon-gamma receptor alpha chain gene, exon 7 and complete cds	0
20213	RG:221172:10007:C11	S74774	p59fyn(T)=OKT3-induced calcium influx regulator [human, Jurkat J6 T cell line, mRNA Partial, 1605 nt]	2.9E-103
24955	M00055929D:D04			
19574	I:635178:13B02:C10	XM_033944	Homo sapiens superoxide dismutase 2, mitochondrial (SOD2), mRNA	0
19969	RG:501476:10010:A05	U14394	Human tissue inhibitor of metalloproteinases-3 mRNA, complete cds	0
8570	I:1696224:06B01:E07	X70684	C.aethiops mRNA for heat shock protein 70	5.6E-25
18519	I:1997703:13A01:D09	X52947	Human mRNA for cardiac gap junction protein	0
9616	I:3200341:06B02:H02	Y00106	Human gene for beta-adrenergic receptor (beta-2 subtype)	0

Table 1

SPOTID	SAMPLE ID	GENBANK NO	GENBANK DESCRIPTION	GENBANK SCORE
22334	M00055067D:H12			
17459	I:2056395:13A02:B07	M77349	Human transforming growth factor-beta induced gene product (BIGH3) mRNA, complete cds	2.5E-121
25193	M00056763B:A12	X68277	H.sapiens CL 100 mRNA for protein tyrosine phosphatase	0
25191	M00056763B:A12	X68277	H.sapiens CL 100 mRNA for protein tyrosine phosphatase	0
9448	I:2455617:04B01:D02	XM_051799	Homo sapiens guanosine monophosphate reductase (GMPR), mRNA	0
25224	RG:950682:10003:D06	BC002536	Homo sapiens, phosphofructokinase, platelet, clone MGC:2192 IMAGE:3140233, mRNA, complete cds	0
20218	RG:2158297:10016:E11	BC002536	Homo sapiens, phosphofructokinase, platelet, clone MGC:2192 IMAGE:3140233, mRNA, complete cds	0
3089	NIH50_26184	D25328	Human mRNA for platelet-type phosphofructokinase, complete cds	2E-108
23985	NIH50_26184			
19953	NIH50_26184	D25328	Human mRNA for platelet-type phosphofructokinase, complete cds	2E-108
11506	NIH50_26184			
22362	M00056349A:F08	M10546	Human mitochondrial DNA, fragment M1, encoding transfer RNAs, cytochrome oxidase I, and 2 URFs	1.2E-86
25516	035JN011.G01	XM_011470	Homo sapiens myristoylated alanine-rich protein kinase C substrate (MARCKS, 80K-L) (MACS), mRNA	0
25757	037XN005.H07	AF017116	Homo sapiens type-2 phosphatidic acid phosphohydrolase (PAP2) mRNA, complete cds	0
24814	M00042773B:E09	M17733	Human thymosin beta-4 mRNA, complete cds	0
21994	M00042465B:E04	M17733	Human thymosin beta-4 mRNA, complete cds	0
27117	037XN001.H03	BC001631	Homo sapiens, prothymosin beta 4, clone MGC:2219 IMAGE:3536637, mRNA, complete cds	0
24681	NIH50_41452			
22745	M00056592A:B08	NM_003739	Homo sapiens aldo-keto reductase family 1, member C3 (3-alpha hydroxysteroid dehydrogenase, type II) (AKR1C3), mRNA	0
24233	M00055873C:B06			
2001	M00001381A:F03	XM_035387	Homo sapiens ribosomal protein, large, P1 (RPLP1), mRNA	0
21179	NIH50_43550			
17147	NIH50_43550	AK026515	Homo sapiens cDNA: FLJ22862 fis, clone KAT01966, highly similar to HSLDHAR Human mRNA for lactate dehydrogenase-A	0
8700	NIH50_43550			
21214	M00056193B:D06	BC006260	Homo sapiens, Similar to N-myc downstream regulated, clone MGC:11293 IMAGE:3946764, mRNA, complete cds	0
26422	037XN003.D08	BC006260	Homo sapiens, Similar to N-myc downstream regulated, clone MGC:11293 IMAGE:3946764, mRNA, complete cds	0
22837	M00055891C:B09			
21965	M00057029A:G09			
25541	035JN013.D01	AK026310	Homo sapiens cDNA: FLJ22657 fis, clone HSI07791, highly similar to HUMCYB5 Human cytochrome b5 mRNA	0

Table 1

SPOTID	SAMPLE ID	GENBANK NO	GENBANK DESCRIPTION	GENBANK SCORE
18302	I:1738248:09B02:G08	XM_016114	Homo sapiens hypothetical protein FLJ22501 (FLJ22501), mRNA	0
24049	M00054706B:G04	AF107495	Homo sapiens FWP001 and putative FWP002 mRNA, complete cds	0
26326	035JN023.D08	AK025906	Homo sapiens cDNA: FLJ22253 fis, clone HRC02763	0
2254	M00004085C:C02	AK025703	Homo sapiens cDNA: FLJ22050 fis, clone HEP09454	0
10296	I:2868216:07B02:D09	AK025703	Homo sapiens cDNA: FLJ22050 fis, clone HEP09454	0
20044	I:2547084:09B01:F05	XM_016847	Homo sapiens hypothetical protein FLJ22002 (FLJ22002), mRNA	0
28806	035JN028.D05	AK025504	Homo sapiens cDNA: FLJ21851 fis, clone HEP01962	0
17566	I:446969:17B02:G07	AK023217	Homo sapiens cDNA FLJ13155 fis, clone NT2RP3003433	2E-115
19005	I:2674167:09A02:G09	AK022968	Homo sapiens cDNA FLJ12906 fis, clone NT2RP2004373	0
3567	M00023369D:C05			
21983	M00057081B:H03			
458	M00022134B:E08	XM_037412	Homo sapiens hypothetical gene supported by BC008993 (LOC91283), mRNA	0
22331	M00057138A:E11			
21411	M00055833D:B03			
22972	M00056956D:B01			
24533	RG:1643392:10014:C11			
24853	M00056617D:F07	AK020869	Mus musculus adult retina cDNA, RIKEN full-length enriched library, clone:A930017A02, full insert sequence	6.5E-59
23753	M00054915A:G02			
21502	M00056193B:D06			
18180	RG:39422:10005:B02			
23918	M00056278C:E03			
24144	RG:1982961:20001:H05			
19996	RG:1283072:10012:F11	BC009107	Homo sapiens, clone MGC:17352 IMAGE:3449913, mRNA, complete cds	0
11528	I:1899534:10B01:D05			
20506	I:1969044:18B01:E12	AB048286	Homo sapiens GS1999full mRNA, complete cds	0
23833	RG:1656861:10014:E10			
20042	I:1873176:09B01:E05	BC001909	Homo sapiens, clone IMAGE:3537447, mRNA, partial cds	0
24977	M00055820D:F01			
11646	I:1723142:08B02:G11	AK014612	Mus musculus 0 day neonate skin cDNA, RIKEN full-length enriched library, clone:4633401I05, full insert sequence	4.6E-45
24872	RG:773612:10011:D06			
10577	I:2174196:08A01:A10			
21710	RG:1091554:10003:G01			
18556	RG:31082:10004:F09			
29433	035JN014.F12	AK001805	Homo sapiens cDNA FLJ10943 fis, clone OVARC1001360	0
29273	037XN005.F12			
28763	035JN018.G11	AJ310543	Homo sapiens mRNA for EGLN1 protein	1.9E-40
27887	RG:2364147:8119908:A10			
27450	035JN032.F09			
27255	035JN006.E09	XM_027456	Homo sapiens hypothetical gene supported by AK000584 (LOC89942), mRNA	1.2E-57

Table 1

SPOTID	SAMPLE ID	GENBANK NO	GENBANK DESCRIPTION	GENBANK SCORE
27226	035JN004.F09			
26550	035JN008.D08			
26508	035JN004.G02			
26483	RG:2377371:8119908:C08			
26334	035JN023.H08	AF364547	Homo sapiens methylmalonyl-CoA epimerase mRNA, complete cds; nuclear gene for mitochondrial product	0
26027	035JN030.G01			
25977	035JN022.F07			
25965	035JN022.H01			
25844	035JN008.C07			
25834	035JN008.F01	AB048289	Bos taurus lae mRNA for lipoate-activating enzyme, complete cds	3.1E-35
25816	035JN004.E07			
25746	037XN007.B07			
25742	037XN007.H01			
25741	037XN005.H01			
25712	037XN003.A07			
25642	035JN027.F01			
25621	035JN021.D07	AK027321	Homo sapiens cDNA FLJ14415 fis, clone HEMBA1004889, weakly similar to Human C3f mRNA	0
25614	035JN023.H01			
25603	035JN021.C01			
25556	035JN015.C07			
25555	035JN013.C07			
25540	035JN015.C01			
23576	RG:1984769:20002:D10			
22566	RG:1996656:20003:C03			
9036	DD182			
4164	M00007932B:E06			
4146	2179-5			
4091	M00026845A:E01			
4072	M00023398A:G12			
4022	M00022127D:B06			
3965	M00005406A:f04			
3954	M00005400B:E1			
3872	M00007974D:B04			
3869	M00003868C:A03			
3838	M00007052A:C09	XM_048272	Homo sapiens similar to Ras-related GTP-binding protein (H. sapiens) (LOC92951), mRNA	0
3806	2168-2			
3798	2138-4			
3792	2171-5			
3788	2156-4			
3767	M00001355D:H12			
3458	M00007160D:E10			
3251	M00005471A:a04			
3194	DF821			
3102	2167-1			
3094	2138-3			
2671	M00023431A:D02			
2634	M00008025D:A04			
2567	M00008061B:A12			
2317	M00001502D:E09			
1958	M00023296B:B09			
1680	2169-5			

Table 1

SPOTID	SAMPLE ID	GENBANK NO	GENBANK DESCRIPTION	GENBANK SCORE
1625	M00001542C:G08			
1445	M00023335C:C09			
1320	2207-5			
974	2161-1			
726	DO15			
718	ER418			
703	M00004189D:A11			
652	M00007070A:C08			
630	2203-2			
593	M00001373A:A06	X93036	H.sapiens mRNA for MAT8 protein	0
532	M00022005A:H05			
272	2168-5			
256	M00001406C:H12			
57	M00023371B:H02			

Table 2

SEQ ID NO.	SPOT ID	2D T4-2/ 2D S1	3D T4-2/ 3D S1	3D S1/ 2D S1	3D T4-2/ 2D T4-2	3D T4-2/ EGFR Ab	3D T4-2/ B1 Integrin Ab	3D T4-2/ Tyr
1	10594	0.6	2.2	0.6	1.9	3.0	1.0	2.9
2	21851	1.0	1.0	1.0	3.5	1.3	1.0	1.0
3	20990	1.6	4.6	1.0	1.5	1.0	1.0	1.0
4	18641	1.0	0.6	2.6	1.7	1.0	1.6	1.0
5	17229	0.3	0.8	1.0	2.1	1.0	1.0	1.0
6	25930	1.0	1.0	1.0	1.0	1.0	1.0	1.0
7	20701	1.6	2.9	1.3	2.7	4.5	1.9	5.8
8	20346	1.7	2.7	1.4	2.6	4.3	2.0	5.2
9	21247	1.0	4.4	1.5	3.0	3.4	2.6	4.7
10	23062	0.6	2.5	0.6	1.8	3.3	1.4	2.7
11	25666	1.0	2.9	0.6	2.0	3.6	1.0	2.3
12	19001	8.5	14.2	1.0	1.0	4.8	1.7	8.0
13	10897	1.0	3.1	4.5	1000.0	13.3	4.6	18.4
14	1960	0.3	1.5	3.0	13.7	3.9	2.4	4.9
15	26381	1.0	1.0	1.0	0.9	1.0	1.0	1.0
16	26719	0.4	1.0	0.6	2.8	1.2	1.7	1.0
17	27152	4.2	3.0	2.2	1.5	1.3	1.0	1.3
18	10926	0.7	1.9	0.9	2.1	3.7	1.5	3.3
19	28980	0.6	1.4	1.0	2.4	1.0	1.0	1.0
20	1236	1.0	2.8	0.8	2.1	2.2	1.8	3.2
21	29350	0.5	0.6	1.2	2.1	1.4	1.0	1.0
22	26242	1.0	1.0	0.6	2.2	1.0	1.0	2.0
23	4098	1.4	3.9	0.6	2.1	2.7	1.3	3.1
24	17432	0.4	0.3	2.4	2.1	0.3	0.9	0.3
25	1785	0.5	0.4	2.4	2.0	0.3	1.0	0.3
26	28856	8.5	0.9	2.5	0.3	0.6	1.0	0.5
27	18791	1.0	0.2	0.3	4.1	1.0	1.0	1.3
28	22950	3.9	4.1	1.2	1.0	2.1	1.0	2.4
29	1882	2.4	4.1	0.9	1.8	3.2	1.5	4.7
30	23886	1.0	1.0	1.2	2.1	1.0	1.0	1.0
31	24995	2.0	1.6	2.1	1.0	1.0	1.0	1.0
32	24477	1.0	1.9	1.0	4.2	2.7	1.3	1.8
33	21681	1.7	7.1	0.6	2.0	2.8	1.0	3.6
34	9557	1.6	7.5	0.8	1.0	3.0	1.0	2.5
35	22033	2.8	3.7	1.0	0.9	2.2	1.0	2.7
36	873	1.0	4.0	1.0	2.7	1.7	1.0	1.0
37	17144	1.0	0.5	3.6	1.4	1.0	1.0	1.0
38	26970	6.0	15.3	0.2	0.6	2.9	1.0	5.4
39	21402	0.2	1.0	2.8	6.9	2.4	1.0	3.6
40	27074	1.7	2.5	2.3	3.2	1.6	1.0	2.0
41	10963	0.5	0.3	2.1	0.5	1.0	1.0	0.7
42	29525	0.6	1.0	0.7	2.4	1.7	1.3	1.0
43	25514	1000.0	1.0	1.0	1.0	0.5	1.0	1.0
44	26612	0.4	0.5	1.6	2.8	0.8	1.0	0.8
45	24600	1.6	2.7	1.0	2.0	1.0	1.2	1.4
46	9741	2.3	5.0	1.0	2.2	1.7	1.0	1.0
47	23689	1.0	2.6	0.8	1.8	2.3	1.0	2.7
48	22352	1.0	2.9	0.7	1.6	2.4	1.0	2.4
49	23806	1.0	0.4	1.3	2.3	1.0	1.4	1.4
50	12285	1.0	1.0	1.0	1.0	0.8	1.0	0.5
51	27638	0.6	1.0	0.8	2.2	2.1	1.0	1.0
52	9663	1.0	1.0	1.0	1000.0	1.0	1.0	1.0
53	26850	1.0	0.2	9.1	2.1	1.3	1.6	2.2

Table 2

SEQ ID NO.	SPOT ID	2D T4-2/ 2D S1	3D T4-2/ 3D S1	3D S1/ 2D S1	3D T4-2/ 2D T4-2	3D T4-2/ EGFR Ab	3D T4-2/ B1 Integrin Ab	3D T4-2/ Tyr
54	10204	2.9	2.3	0.8	0.6	3.1	1.4	2.4
55	1318	2.0	0.9	2.3	0.5	0.6	1.1	0.7
56	25922	1.0	0.8	1.0	1.0	1.0	1.0	1.0
57	26347	1.0	1.0	1.0	1.0	1.0	1.0	1.0
58	20361	1.0	1.0	1.0	2.0	1.0	1.0	1.0
59	28672	0.6	2.1	0.6	2.1	1.4	1.0	1.7
60	25520	0.5	0.3	2.3	1.3	1.0	0.7	0.5
61	1723	1.0	0.5	5.1	3.5	1.0	3.1	1.0
62	28863	0.8	1.3	1.0	2.3	1.7	1.7	1.7
63	25526	5.9	1.7	1.0	0.6	0.6	0.7	0.4
64	27936	1.0	1.0	3.2	3.1	1.9	3.1	1.5
65	26851	1.0	0.7	3.2	2.7	1.6	2.4	1.3
66	25107	1.0	5.8	1.0	2.6	2.6	1.6	2.6
67	24912	1.0	2.9	1.0	2.4	1.6	1.3	1.8
68	25169	1.0	0.7	2.5	1.5	1.0	1.0	1.0
69	25600	1.6	1.4	2.9	2.1	0.7	0.9	0.5
70	28706	0.2	0.5	0.6	2.1	1.3	1.2	1.0
71	26377	0.6	0.3	2.2	1.0	1.2	1.3	1.0
72	19460	2.4	1.5	2.5	1.3	1.0	1.0	0.8
73	25243	1.0	0.7	2.2	1.0	1.0	1.0	1.0
74	20018	1.0	1.0	1.0	2.6	1.0	1.0	1.0
75	918	1.0	1.7	1.3	2.1	2.0	1.6	2.4
76	25027	1.0	1.0	1.0	1.0	1.0	1.0	1.0
77	29089	0.6	0.5	0.8	2.1	1.0	1.0	1.0
78	9141	1.0	1.0	1.0	1.0	1.0	1.0	1.0
79	12005	1.0	1.0	2.2	1.0	1.0	1.0	1.0
80	12148	1.0	1.0	1.0	1.0	1.0	1.0	1.0
81	17394	0.4	0.6	2.1	2.0	1.0	1.0	1.0
82	27017	2.8	3.3	0.8	1.0	2.4	1.8	2.8
83	25809	1.0	1.0	1000.0	1.0	1.0	1.0	1.0
84	8719	0.1	1.0	2.3	2.1	0.4	0.5	0.3
85	21030	0.4	1.0	1.3	2.1	1.4	1.6	1.4
86	11436	0.7	0.4	2.0	1.0	0.6	0.8	0.6
87	10374	1.5	1.5	3.5	2.7	0.4	1.0	0.3
88	19037	3.0	3.3	0.9	1.5	2.7	1.4	3.7
89	398	1.6	6.9	1.1	3.3	2.4	1.0	4.5
90	18773	1.9	5.1	1.0	3.9	3.8	2.0	6.1
91	3583	0.5	0.7	1.0	2.0	2.5	1.0	1.5
92	3418	1.8	3.2	1.2	2.4	1.6	1.0	1.2
93	18985	9.2	3.1	1.0	0.6	2.3	1.1	2.5
94	25861	3.4	1.5	2.0	0.8	0.8	0.9	0.6
95	3317	0.9	2.3	1.0	3.4	1.9	1.0	1.0
96	8743	0.2	0.7	1.0	4.3	1.8	1.0	1.7
97	26240	0.2	1.0	1.0	5.3	1.9	1.9	1.1
98	28562	0.3	0.2	2.0	1.0	0.5	0.5	0.6
99	16877	1.0	2.6	1.1	2.6	1.7	1.5	1.3
100	25955	1.0	1.0	1.0	1.0	1.0	1.0	1.0
101	26308	0.2	0.4	1.0	2.2	0.7	0.8	0.6
102	4140	1.9	6.7	0.7	2.1	3.0	1.0	3.5
103	3436	1.8	6.3	0.6	2.2	3.1	1.3	3.3
104	25612	1.0	12.5	1.0	1.0	2.1	1.0	2.9
105	12257	1.0	1.0	2.0	1.0	0.8	0.9	0.8
106	9111	0.5	0.5	2.2	1.3	1.5	1.0	0.7

Table 2

SEQ ID NO.	SPOT ID	2D T4-2/ 2D S1	3D T4-2/ 3D S1	3D S1/2D S1	3D T4-2/ 2D T4-2	3D T4-2/ EGFR Ab	3D T4-2/ B1 Integrin Ab	3D T4-2/ Tyr
107	17620	0.3	0.8	1.0	3.2	2.7	2.1	1.0
108	26025	1.0	2.9	1.1	2.2	2.3	1.0	2.6
109	19271	0.5	1.3	0.7	2.2	1.6	1.2	1.5
110	4151	0.4	4.2	1.2	11.1	4.2	1.0	2.9
111	26569	0.7	2.2	0.8	2.9	2.3	1.7	2.6
112	10344	1.0	1.0	1.0	1.0	1.0	1.0	1.0
113	832	1.0	3.3	1.0	2.4	3.7	2.2	4.0
114	12071	1.8	1.5	2.2	1.0	1.3	0.8	1.4
115	12271	0.6	4.9	1.9	14.9	20.8	4.0	24.1
116	11433	0.5	0.4	5.7	3.0	1.7	1.8	1.0
117	20917	1.0	2.8	0.9	2.6	1.7	1.4	1.7
118	25810	1.1	3.8	1.0	2.9	1.5	1.3	1.5
119	12039	1.0	1.0	3.6	1.0	1.0	1.0	1.0
120	25499	1.0	1.0	1.0	1.0	1.0	1.0	1.0
121	25557	1.0	1.8	1.0	0.8	1.0	1.0	1.0
122	9917	2.5	2.7	0.7	1.6	3.8	1.2	3.6
123	19505	0.4	1.7	0.7	3.8	1.7	1.6	1.4
124	17491	0.6	1.7	0.7	2.5	1.6	1.3	1.4
125	10683	0.4	1.9	0.6	3.6	1.7	1.4	1.1
126	1936	0.2	0.6	0.6	3.1	1.0	1.8	1.0
127	828	0.1	1.0	0.5	3.0	1.0	1.7	1.2
128	9558	1.0	1.0	1.0	1.0	1.0	1.0	1.0
129	20164	2.0	1.1	2.5	1.7	1.0	1.0	0.8
130	969	1.0	1.0	2.7	1.0	1.0	1.5	0.7
131	9910	0.4	1.0	0.8	3.2	1.9	1.3	1.4
132	2427	1.3	0.7	3.0	2.8	0.8	1.9	1.0
133	19990	1.0	7.9	2.8	34.7	1.0	1.0	1.0
134	20605	3.0	1.2	2.1	1.0	1.3	1.2	0.8
135	10650	0.5	1.7	0.5	2.9	2.8	0.6	3.4
136	25963	2.6	3.5	0.7	1.0	3.3	1.0	2.3
137	25562	3.2	5.9	0.7	1.0	4.2	1.0	4.8
138	9377	0.6	1.0	1.0	2.1	1.9	2.0	1.6
139	17618	1.0	0.7	2.3	3.2	0.8	0.7	0.8
140	12136	1.0	1.0	3.8	1.0	1.0	1.0	1.0
141	17373	1.0	0.4	6.1	2.4	1.0	1.0	1.0
142	18577	1.0	0.3	0.3	4.6	1.0	1.0	1.0
143	3143	1.7	1.3	2.6	2.3	0.7	1.0	0.5
144	17737	6.1	0.7	3.4	0.3	0.5	1.3	0.4
145	20029	1.0	0.6	2.3	1.0	1.0	1.0	0.5
146	18537	1.0	1.3	2.1	2.6	1.3	1.0	1.2
147	10090	1.0	1.7	2.1	2.8	1.5	1.0	1.2
148	12102	1.0	1.0	3.9	1.0	1.0	1.0	1.0
149	8487	4.7	2.4	1.0	1.0	2.3	1.1	2.2
150	9252	1.3	3.8	0.3	1.0	2.1	1.6	2.5
151	25605	1.0	1.0	1.0	1.0	0.5	0.5	1.0
152	29652	1.0	2.9	1.5	2.9	2.0	1.5	2.1
153	10858	1.0	0.8	2.0	1.0	1.0	1.0	0.7
154	1261	0.2	0.6	1.0	2.9	0.8	0.8	0.9
155	4156	12.4	0.8	3.1	0.2	0.6	1.0	0.3
156	3452	10.6	0.8	2.8	0.3	0.6	1.0	0.4
157	2748	10.8	0.8	3.1	0.2	0.5	1.0	0.4
158	2046	9.2	1.0	2.4	0.3	0.5	1.2	0.4
159	2044	11.7	0.8	2.8	0.2	0.6	1.4	0.4

Table 2

SEQ ID NO.	SPOT ID	2D T4-2/ 2D S1	3D T4-2/ 3D S1	3D S1/ 2D S1	3D T4-2/ 2D T4-2	3D T4-2/ EGFR Ab	3D T4-2/ B1 Integrin Ab	3D T4-2/ Tyr
160	1342	10.5	0.9	2.8	0.2	0.5	1.2	0.4
161	1326	12.2	1.0	2.7	0.2	0.5	1.0	0.4
162	9981	0.2	1.5	0.3	2.5	1.2	1.6	0.5
163	27917	1.9	2.5	0.5	1.0	2.1	1.4	2.3
164	8488	4.3	2.4	1.0	0.5	2.9	0.9	3.6
165	22793	1.9	2.6	0.5	1.0	2.2	1.8	2.1
166	26883	2.4	3.7	0.5	1.0	2.5	2.0	2.0
167	11540	0.7	1.0	1.3	2.8	0.8	1.0	0.5
168	17707	1.0	0.6	2.6	1.0	1.0	1.0	1.0
169	20649	2.3	2.6	0.5	0.4	3.0	1.0	3.1
170	24004	1.0	2.5	1.8	3.6	2.3	1.0	2.8
171	11836	1.2	5.0	0.9	3.7	1.3	1.0	0.8
172	24932	1.8	0.8	6.5	2.1	0.8	1.0	0.5
173	19143	0.6	1.6	0.7	2.0	1.7	1.2	1.4
174	26257	1.9	1.3	2.2	1.7	0.7	1.0	0.6
175	21239	9.4	9.2	0.5	0.4	2.4	1.0	2.7
176	16959	0.6	2.1	0.8	2.1	3.0	1.4	2.5
177	2568	0.7	1.9	0.7	2.2	3.0	1.3	2.4
178	25936	1.0	2.4	0.7	2.0	3.1	1.5	2.4
179	23041	0.7	1.0	2.1	2.6	1.0	1.4	1.0
180	9206	5.7	1.8	4.6	1.0	1.0	0.7	0.9
181	25105	1.6	1.3	2.1	1.0	1.0	0.7	0.8
182	24779	1.0	1.0	1.0	2.9	2.3	1.4	1.2
183	22451	1.0	0.2	2.1	1.0	1.4	0.6	1.0
184	22291	0.2	0.2	2.1	1.0	0.6	0.6	0.5
185	21143	1.0	7.2	0.7	2.0	2.6	1.1	2.4
186	24751	1.7	5.0	0.7	2.1	2.4	1.3	4.0
187	24294	1.7	3.9	0.8	2.4	2.6	1.1	3.9
188	24006	1.7	6.3	0.8	2.5	2.4	1.0	4.0
189	25678	1.0	1.0	1.0	1.0	1.0	1.0	1.0
190	22027	8.7	7.0	0.4	0.2	5.1	2.0	5.2
191	29495	1.0	1.0	1.0	1.0	1.0	1.0	1.0
192	24577	6.8	3.2	0.8	0.4	3.8	1.3	2.1
193	23527	0.3	2.1	1.6	6.4	2.7	2.1	3.4
194	17090	1.0	4.9	0.7	2.3	3.1	2.3	3.6
195	25137	1.0	1.0	0.4	3.8	1.0	2.5	4.1
196	23772	0.6	6.8	0.5	3.7	12.6	3.6	9.2
197	1659	1.0	7.5	0.3	3.2	17.8	4.1	20.3
198	8497	1.3	0.4	2.2	0.5	1.0	1.0	1.0
199	25272	8.0	6.0	1.0	0.6	2.2	1.0	2.9
200	21216	1.0	1.0	0.6	2.0	2.5	2.0	2.2
201	11939	1.0	1.0	1.0	1.0	1.0	1.0	1.0
202	9191	1.8	2.2	1.3	1.1	2.2	1.0	2.0
203	3429	0.7	3.4	0.8	3.5	3.0	1.5	3.7
204	2725	0.8	3.4	1.0	3.4	2.6	1.6	4.1
205	19923	1.0	1.1	2.9	1.0	1.7	1.4	1.2
206	20457	1.0	2.0	1.0	2.3	2.9	1.0	2.3
207	24773	0.2	1.0	0.8	2.0	1.6	1.0	1.0
208	24119	0.2	4.6	1.1	15.9	2.7	1.0	3.4
209	3908	0.3	0.5	1.1	2.3	1.7	1.0	1.0
210	8560	1.9	0.7	2.2	0.5	1.0	1.0	0.7
211	24588	0.3	0.5	1.0	2.0	1.0	1.0	1.4
212	4047	0.5	1.2	1.0	2.1	1.9	1.0	1.8

Table 2

SEQ ID NO.	SPOT ID	2D T4-2/ 2D S1	3D T4-2/ 3D S1	3D S1/ 2D S1	3D T4-2/ 2D T4-2	3D T4-2/ EGFR Ab	3D T4-2/ B1 Integrin Ab	3D T4-2/ Tyr
213	28344	0.8	1.0	1.0	2.0	1.7	1.5	2.7
214	27561	1.0	1.0	1.0	2.4	1.2	1.2	1.3
215	3272	0.6	0.8	1.0	2.1	1.3	1.6	1.0
216	26735	1.0	1.0	1.0	1.0	1.0	1.0	1.0
217	24900	0.3	0.8	2.9	5.7	2.2	1.1	3.0
218	9472	2.2	5.0	1.0	2.0	1.5	0.8	1.7
219	9979	1.3	3.3	1.5	3.9	3.4	1.4	2.5
220	21996	1.0	4.7	1.0	3.4	2.5	1.0	2.4
221	22312	1.2	4.4	1.2	3.3	2.2	1.1	2.2
222	11327	1.4	6.2	1.4	2.7	2.7	1.0	2.2
223	18240	2.0	4.5	1.0	2.2	2.1	1.0	2.7
224	21922	0.7	1.4	0.8	2.1	1.8	1.0	1.3
225	22290	0.7	1.6	0.9	2.1	1.5	1.2	1.3
226	10390	1.3	1.0	2.6	1.6	0.8	1.0	0.6
227	2212	1.9	1.0	2.8	1.0	0.6	1.6	0.8
228	20213	0.4	1.0	1.0	1.0	1.0	1.0	1.0
229	24955	0.9	2.9	1.0	3.3	0.8	0.8	1.0
230	19574	1.0	0.6	3.7	3.1	1.5	2.6	1.4
231	19969	1.0	1.0	1.0	3.1	1.0	1.0	1.0
232	8570	0.4	1.2	1.0	2.6	1.2	0.8	0.6
233	18519	3.5	2.9	2.6	1.8	1.8	1.0	2.0
234	9616	0.6	2.0	1.0	2.3	1.2	1.2	1.0
235	22334	0.2	0.7	2.9	8.5	1.7	1.1	3.4
236	17459	0.1	0.7	2.7	18.8	4.0	1.3	4.6
237	25193	1.0	0.8	1.0	2.3	1.0	1.3	1.0
238	25191	0.2	0.8	0.7	2.5	1.3	1.5	1.2
239	9448	0.6	1.0	1.0	2.3	0.8	0.8	0.5
240	25224	5.6	14.4	1.0	2.3	6.0	1.5	9.6
241	20218	6.1	12.3	0.7	1.7	5.6	1.6	9.0
242	3089	7.0	15.7	0.7	2.3	7.3	1.8	8.0
243	23985	5.8	17.2	0.9	2.1	6.8	1.8	8.1
244	19953	6.2	13.5	0.8	1.8	6.4	1.7	10.4
245	11506	4.1	13.3	1.0	1.4	4.4	1.6	7.2
246	22362	1.0	0.7	4.1	2.1	1.2	1.8	1.0
247	25516	0.7	10.1	0.4	4.0	14.7	4.7	8.1
248	25757	0.6	0.4	2.4	1.0	1.0	1.3	0.9
249	24814	0.5	2.8	0.3	1.0	3.5	1.4	4.4
250	21994	0.5	3.2	0.3	1.0	3.6	1.0	4.3
251	27117	1.0	2.8	0.3	1.0	3.9	1.0	4.9
252	24681	1.8	2.6	0.6	0.5	3.2	1.5	3.0
253	22745	0.3	2.4	1.4	8.1	2.8	2.3	3.5
254	24233	1.9	3.9	1.3	2.3	1.3	0.8	2.2
255	2001	1.0	1.0	1.5	2.1	1.0	1.0	1.0
256	21179	2.0	7.9	0.7	1.9	2.1	1.0	4.3
257	17147	1.3	4.3	0.7	1.7	2.4	1.2	3.9
258	8700	1.5	7.3	0.7	1.6	3.1	1.0	2.7
259	21214	0.3	5.4	1.2	15.5	3.1	1.0	3.6
260	26422	0.4	3.7	1.0	12.7	3.9	1.0	3.3
261	22837	0.7	1.0	2.1	2.4	1.2	1.5	0.9
262	21965	1.0	1.0	1.0	2.2	2.4	1.0	1.0
263	25541	4.5	2.7	2.7	0.8	1.0	1.3	0.8
264	18302	1.1	0.9	2.1	1.0	1.0	1.0	1.0
265	24049	1.0	2.6	1.5	2.5	2.3	1.4	2.4

Table 2

SEQ ID NO.	SPOT ID	2D T4-2/ 2D S1	3D T4-2/ 3D S1	3D S1/ 2D S1	3D T4-2/ 2D T4-2	3D T4-2/ EGFR Ab	3D T4-2/ B1 Integrin Ab	3D T4-2/ Tyr
266	26326	9.2	1.5	3.2	0.7	0.7	0.9	1.0
267	2254	1.6	3.3	1.0	2.8	2.0	1.1	3.1
268	10296	0.9	1.7	2.9	5.0	2.1	1.0	1.3
269	20044	1.0	0.8	2.0	1.0	1.0	1.0	1.0
270	28806	2.8	1.1	2.1	1.0	0.9	1.2	0.8
271	17566	7.5	4.2	0.7	0.5	2.5	1.0	2.5
272	19005	1.0	0.8	1.0	2.1	1.0	1.0	1.0
273	3567	1.0	1.0	1.0	1.0	1.0	1.0	1.0
274	21983	0.1	1.0	3.1	25.6	3.4	1.0	4.7
275	458	1.0	2.1	0.6	1.0	1.6	2.1	2.3
276	22331	0.6	2.1	0.4	1.0	2.2	1.0	2.8
277	21411	0.7	1.5	1.0	2.5	1.0	1.0	1.0
278	22972	1.0	2.2	0.5	1.0	2.2	1.4	2.4
279	24533	1.0	2.5	1.0	2.0	2.0	2.7	3.2
280	24853	1.0	2.6	2.1	2.1	2.4	1.3	2.1
281	23753	0.7	1.5	1.3	2.1	2.0	1.7	2.3
282	21502	0.3	4.8	1.0	10.8	2.6	1.0	2.9
283	18180	0.3	0.8	0.8	2.4	0.9	1.4	0.7
284	23918	0.7	2.3	0.4	1.0	2.4	1.2	3.5
285	24144	1.0	1.0	1.0	1.0	1.0	1.6	1.0
286	19996	1.5	2.5	0.7	1.2	2.1	0.9	2.5
287	11528	1.0	1.0	1.0	2.1	1.0	1.0	1.0
288	20506	2.2	0.9	3.2	0.8	1.3	1.6	1.0
289	23833	1.0	0.5	2.1	1.0	1.0	1.0	0.7
290	20042	3.8	1.6	2.3	0.8	1.0	1.0	1.0
291	24977	1.0	1.0	2.1	1.0	2.3	1.4	1.4
292	11646	1.0	1.0	0.8	1000.0	1.0	1.0	1.7
293	24872	1.0	1.4	0.8	2.5	1.4	1.2	1.3
294	10577	1.0	1.0	1.0	1.0	1.0	1.0	1.0
295	21710	1.0	0.2	2.2	0.7	1.6	1.0	1.2
296	18556	0.0	1.0	1.0	1.0	1.0	1.0	1.0
297	29433	1.0	0.5	1.0	2.1	1.0	1.0	1.0
298	29273	1.0	2.2	1.0	2.2	1.0	1.3	1.0
299	28763	1.6	2.7	1.0	2.2	1.8	1.3	2.5
300	27887	0.1	0.2	1.1	2.7	0.8	1.0	0.6
301	27450	2.6	11.3	0.2	1.0	4.4	3.3	7.3
302	27255	0.6	1.6	0.8	2.3	1.7	1.4	1.5
303	27226	1.0	1.3	1.0	2.6	1.8	1.0	1.0
304	26550	4.2	17.9	0.2	1.0	6.9	2.9	9.2
305	26508	1.0	1.4	1.0	1.0	1.0	1.0	1.0
306	26483	1.2	2.2	0.6	1.0	2.1	1.4	2.7
307	26334	1.0	0.5	3.0	1.0	0.6	0.8	0.5
308	26027	1.0	1.0	1.0	1.5	1.0	1.0	1.0
309	25977	1.0	1.0	1.0	1.0	1.0	1.0	1.0
310	25965	1.0	1.0	1.0	1.0	1.0	1.0	1.0
311	25844	1.0	1.0	1.0	1.0	1.0	1.0	1.0
312	25834	1000.0	1.0	1.0	1.0	0.4	1.0	1.0
313	25816	1.0	1.0	1.0	1.0	1.0	1.0	1.0
314	25746	1.0	1.0	1.0	1.0	1.0	1.0	1.0
315	25742	1.0	1.0	1.0	1.0	0.5	1.0	1.0
316	25741	1.0	1.0	1.0	1.0	1.0	1.0	1.0
317	25712	1.0	1.0	1.0	1.0	1.0	1.0	1.0
318	25642	1.0	1.0	1.0	1.0	1.0	1.0	1.0

Table 2

SEQ ID NO.	SPOT ID	2D T4-2/ 2D S1	3D T4-2/ 3D S1	3D S1/ 2D S1	3D T4-2/ 2D T4-2	3D T4-2/ EGFR Ab	3D T4-2/ B1 Integrin Ab	3D T4-2/ Tyr
319	25621	0.6	0.8	2.1	2.0	1.3	1.2	1.0
320	25614	1.0	1.0	1.0	1.0	1.0	1.0	1.0
321	25603	1.0	1.0	1.0	1.0	1.0	1.0	1.0
322	25556	1.8	0.7	1.0	0.8	1.0	1.0	1.0
323	25555	1.0	2.9	1.0	1.0	1.5	1.3	1.0
324	25540	1.0	1.0	1.0	1.2	1.0	1.0	1.0
325	23576	0.0	1.0	1.0	1.0	1.0	1.5	1.4
326	22566	1.0	1.0	1.0	1.0	1.0	1.3	1.0
327	9036	1.9	3.8	0.6	1.8	2.6	1.3	3.1
328	4164	1.0	1.0	2.2	1.0	1.5	1.0	0.9
329	4146	0.8	3.7	0.9	4.4	3.3	1.0	4.3
330	4091	1.0	1.0	1.0	2.5	1.7	1.0	0.9
331	4072	1.0	1.0	2.1	1.0	5.9	2.0	5.1
332	4022	3.5	4.5	0.8	1.0	3.0	1.0	3.2
333	3965	1.9	5.6	0.4	1.0	5.5	2.3	4.1
334	3954	1.0	2.7	1.3	3.6	2.8	1.9	2.6
335	3872	1.0	3.2	1.3	2.8	4.0	1.8	3.9
336	3869	1.0	1.0	5.8	3.8	1.0	0.7	0.6
337	3838	1.0	1.6	1.2	2.0	2.6	1.7	1.9
338	3806	0.6	2.6	0.9	3.7	3.0	1.0	3.4
339	3798	10.2	0.9	2.9	0.3	0.7	1.0	0.4
340	3792	1.0	1.0	1.0	2.7	2.9	1.0	2.5
341	3788	1.7	5.4	1.2	3.4	2.5	1.3	2.7
342	3767	1.1	2.2	0.7	1.7	2.5	1.0	2.5
343	3458	1.2	3.3	0.7	2.0	2.6	1.0	2.2
344	3251	0.4	0.5	1.4	2.7	1.4	1.0	1.0
345	3194	1.0	2.3	1.3	3.1	2.2	1.3	3.2
346	3102	0.5	3.2	1.0	4.8	2.9	1.0	2.3
347	3094	11.5	0.8	2.7	0.3	0.6	1.0	0.4
348	2671	0.8	1.6	1.0	2.2	2.8	1.9	1.0
349	2634	0.9	2.8	0.4	1.0	3.8	1.7	4.0
350	2567	4.6	3.3	0.8	0.6	2.6	1.0	3.3
351	2317	1.0	1.0	2.4	1.0	1.0	1.0	1.1
352	1958	0.3	0.6	1.0	2.6	0.9	0.8	0.9
353	1680	0.3	4.7	1.0	17.7	2.7	1.0	4.5
354	1625	2.2	7.8	0.5	1.8	3.1	1.7	3.4
355	1445	0.2	0.6	1.0	2.7	0.8	0.9	0.9
356	1320	4.9	1.0	2.4	0.4	0.6	1.2	0.5
357	974	0.6	3.1	1.1	3.2	2.4	1.4	3.7
358	726	1.0	1.0	1.0	1.0	1.0	1.0	1.0
359	718	0.4	2.6	0.5	2.7	1.6	1.0	1.0
360	703	1.0	4.1	1.0	2.4	1.6	1.0	1.7
361	652	2.8	4.4	1.6	2.3	1.0	1.6	1.0
362	630	6.9	1.0	2.2	0.3	0.6	1.0	0.5
363	593	1.0	4.3	1.0	2.3	1.0	1.0	1.0
364	532	1.3	4.7	1.0	2.4	2.6	2.2	4.0
365	272	0.7	2.7	0.9	3.1	2.4	1.3	4.3
366	256	0.6	3.2	0.5	1.9	2.8	1.0	3.4
367	57	0.5	1.4	1.0	2.3	0.9	1.0	0.7

Table 11

SEQ ID NO	SPOT ID
1	10594
2	21851
3	20990
4	18641
5	19037
6	398
7	18773
8	3583
9	3418
10	145306
11	3418
12	3418
13	18985
14	17229
15	25930
16	25930
17	20701
18	20346
19	20346
20	21247
21	21247
22	23062
23	25666
24	25666
25	19001
26	10897
27	10897
28	10897
29	1960
30	146262
31	26381
32	26381
33	26719
34	26719
35	27152
36	10926
37	28980
38	1236
39	29350
40	29350

Table 11

SEQ ID NO	SPOT ID
41	26242
42	4098
43	145253
44	4098
45	17432
46	17432
47	1785
48	1785
49	1785
50	28856
51	28856
52	18791
53	18791
54	22950
55	22950
56	1882
57	23886
58	24995
59	24995
60	24477
61	21681
62	21681
63	9557
64	9557
65	22033
66	873
67	17144
68	26970
69	26970
70	21402
71	27074
72	27074
73	10963
74	10963
75	29525
76	29525
77	25514
78	25514
79	26612
80	26612

Table 11

SEQ ID NO	SPOT ID
81	24600
82	9741
83	9741
84	9741
85	23689
86	23689
87	22352
88	23806
89	12285
90	27638
91	27638
92	9663
93	9663
94	26850
95	10204
96	10204
97	10204
98	25922
99	25922
100	26347
101	26347
102	20361
103	20361
104	28672
105	28672
106	25520
107	25520
108	1723
109	1723
110	28863
111	25526
112	25526
113	27936
114	27936
115	26851
116	25107
117	25107
118	25107
119	24912
120	24912

Table 11

SEQ ID NO	SPOT ID
121	25169
122	25600
123	25600
124	28706
125	28706
126	26377
127	26377
128	19460
129	25243
130	20018
131	20018
132	918
133	25027
134	29089
135	29089
136	9141
137	9141
138	9141
139	12005
140	12148
141	12148
142	17394
143	27017
144	27017
145	25809
146	8719
147	8719
148	21030
149	21030
150	11436
151	11436
152	10374
153	10374
154	25861
155	25861
156	3317
157	3317
158	8743
159	26240
160	26240

Table 11

SEQ ID NO	SPOT ID
161	28562
162	16877
163	25955
164	26308
165	26308
166	4140
167	3436
168	25612
169	25612
170	12257
171	12257
172	9111
173	9111
174	17620
175	26025
176	26025
177	19271
178	4151
179	4151
180	26569
181	26569
182	10344
183	10344
184	10344
185	832
186	832
187	12071
188	12071
189	12271
190	11433
191	20917
192	25810
193	12039
194	12039
195	25499
196	25499
197	25557
198	25557
199	9917
200	19505

Table 11

SEQ ID NO	SPOT ID
201	17491
202	10683
203	10683
204	1936
205	828
206	9558
207	9558
208	20164
209	969
210	969
211	9910
212	2427
213	19990
214	20605
215	20605
216	10650
217	10650
218	25963
219	25963
220	25562
221	25562
222	3429
223	2725
224	19923
225	20457
226	20457
227	24773
228	24119
229	3908
230	3908
231	8560
232	8560
233	9377
234	9377
235	17618
236	12136
237	17373
238	18577
239	18577
240	3143

Table 11

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243	20029
244	20029
245	18537
246	18537
247	12102
248	12102
249	8487
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251	9252
252	25605
253	25605
254	29652
255	10858
256	1261
257	4156
258	4156
259	3452
260	3452
261	2748
262	2046
263	2046
264	2044
265	2044
266	1342
267	1342
268	1326
269	1326
270	9981
271	9981
272	27917
273	8488
274	22793
275	22793
276	26883
277	26883
278	11540
279	17707
280	20649

Table 11

SEQ ID NO	SPOT ID
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283	24004
284	11836
285	11836
286	11836
287	24932
288	19143
289	19143
290	26257
291	26257
292	21239
293	21239
294	16959
295	2568
296	25936
297	25936
298	23041
299	9206
300	25105
301	25105
302	24779
303	22451
304	22451
305	22291
306	22291
307	21143
308	24751
309	24751
310	24294
311	24294
312	24006
313	24006
314	25678
315	25678
316	22027
317	29495
318	29495
319	24577
320	24577

Table 11

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323	17090
324	25137
325	23772
326	1659
327	8497
328	25272
329	21216
330	21216
331	21216
332	11939
333	11939
334	11939
335	9191
336	3429
337	24588
338	4047
339	28344
340	28344
341	27561
342	3272
343	26735
344	26735
345	24900
346	24900
347	9472
348	9472
349	9979
350	21996
351	22312
352	11327
353	18240
354	18240
355	21922
356	21922
357	22290
358	10390
359	10390
360	2212

Table 11

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363	24955
364	19574
365	19969
366	8570
367	18519
368	9616
369	9616
370	17459
371	17459
372	25193
373	25193
374	25193
375	25191
376	22566
377	4164
378	4146
379	4072
380	4022
381	3954
382	3838
383	3806
384	3798
385	3792
386	3788
387	3458
388	3194
389	3102
390	25191
391	25191
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393	9448
394	25224
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396	3089
397	3089
398	19953
399	19953
400	22362

Table 11

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406	27117
407	22745
408	24233
409	2001
410	2001
411	2001
412	17147
413	21214
414	21214
415	21214
416	26422
417	21965
418	25541
419	25541
420	18302
421	18302
422	24049
423	24049
424	26326
425	26326
426	2254
427	162502
428	10296
429	20044
430	28806
431	17566
432	17566
433	19005
434	3567
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436	3567
437	3567
438	458
439	21411
440	22972

Table 11

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446	19996
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452	20042
453	11646
454	10577
455	10577
456	18556
457	29433
458	28763
459	27450
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462	26550
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464	26508
465	26334
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467	26027
468	26027
469	25977
470	25977
471	25965
472	25965
473	25844
474	25844
475	25834
476	25816
477	25746
478	25712
479	25621
480	25621

Table 11

SEQ ID NO	SPOT ID
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488	25555
489	3094
490	2567
491	1958
492	1680
493	1445
494	1320
495	974
496	652
497	630
498	593
499	256

CLAIMS

That which is claimed is:

- 5 1. A method for inhibiting a cancerous phenotype of a cell, said method comprising:
contacting a cancerous mammalian cell with an agent for inhibition of DKFZP566I133
activity.
2. The method of claim 1, wherein said test cell is a breast cell.
- 10 3. The method of claims 1-2, wherein said cancerous phenotype is aberrant cellular
proliferation relative to a normal cell.
4. The method of claims 1-3, wherein said cancerous phenotype is loss of contact inhibition
15 of cell growth.
5. The method of claims 1-4, wherein said agent is selected from the group consisting of a
small molecule, an antibody, an antisense polynucleotide, and an RNAi molecule.
- 20 6. The method of claims 1-6, wherein said inhibition is associated with a reduction in a level
of DKFZP566I133 protein.
7. The method of claims 1-7, wherein said inhibition is associated with a reduction in a level
of DKFZP566I133 RNA.
- 25 8. The method of claims 1-8, wherein said inhibition is associated with a reduction in a level
of activity of DKFZP566I133 protein.
9. A method for detecting a cancerous cell, said method comprising:
30 detecting a level of DKFZP566I133 or fragment thereof in a test sample obtained from a cell
of a subject,
comparing the level of DKFZP566I133 to a control level of DKFZP566I133,
wherein the presence of a cancerous cell is indicated by detection of said level and
comparison to a control level of DKFZP566I133.

10. The method of claim 9, wherein said cancerous cell is a cancerous breast cell.

11. The method of claims 9-10, wherein said gene product is nucleic acid.

5

12. The method of claims 9-11, wherein said gene product is a polypeptide.

13. The method of claims 9-12, wherein said detecting step uses a polymerase chain reaction.

10

14. The method of claims 9-13, wherein said detecting step uses hybridization.

15. The method of claims 9-14, wherein said sample is a sample of breast tissue.

15 16. The method of claims 9-15, wherein said level of said product is indicative of the cancerous state of the cell of the test sample.

17. A method of treating a subject with cancer, said method comprising:
administering to a subject a pharmaceutically effective amount of an agent,
20 wherein said agent modulates the activity of DKFZP566I133.

18. The method of claim 17, wherein said cancer is breast cancer.

19. The method of claims 17-18, wherein said agent is selected from the group consisting
25 of a small molecule, an antibody, an antisense polynucleotide, and an RNAi molecule.

20. A method for assessing the tumor burden of a subject, said method comprising:
detecting a level of DKFZP566I133 in a test sample from a subject,
wherein the level of DKFZP566I133 in the test sample is indicative of the tumor
30 burden in the subject.

21. A method for identifying an agent that modulates a biological activity of a gene product differentially expressed in a cancerous cell as compared to a normal cell, said method comprising:

contacting a candidate agent with a DKFZP566I133; and

detecting modulation of a biological activity of DKFZP566I133 relative to a level of biological activity of DKFZP566I133 in the absence of the candidate agent.

5 22. The method of claim 21, wherein said cancerous cell and said normal cell are breast cells.

23. The method of claims 21-22, wherein said detecting is by assessing expression of said gene product.

10

24. The method of claim 23, wherein expression is assessed by detecting a polynucleotide gene product.

15

25. The method of claims 23-24, wherein expression is assessed by detecting a polypeptide gene product.

20

26. The method of claims 21-25, wherein said candidate agent is selected from the group consisting of a small molecule, an antibody, an antisense polynucleotide, and an RNAi molecule.

27. The method of claims 21-26, wherein said biological activity is modulation of a cancerous phenotype.

25

28. The method of claim 27, wherein said cancerous phenotype is abnormal cellular proliferation.

29. The method of claim 27-28, wherein said cancerous phenotype is loss of contact inhibition.

30

30. An isolated polynucleotide comprising at least 15 contiguous nucleotides of a sequence selected from the group consisting of SEQ ID NO:1-499.

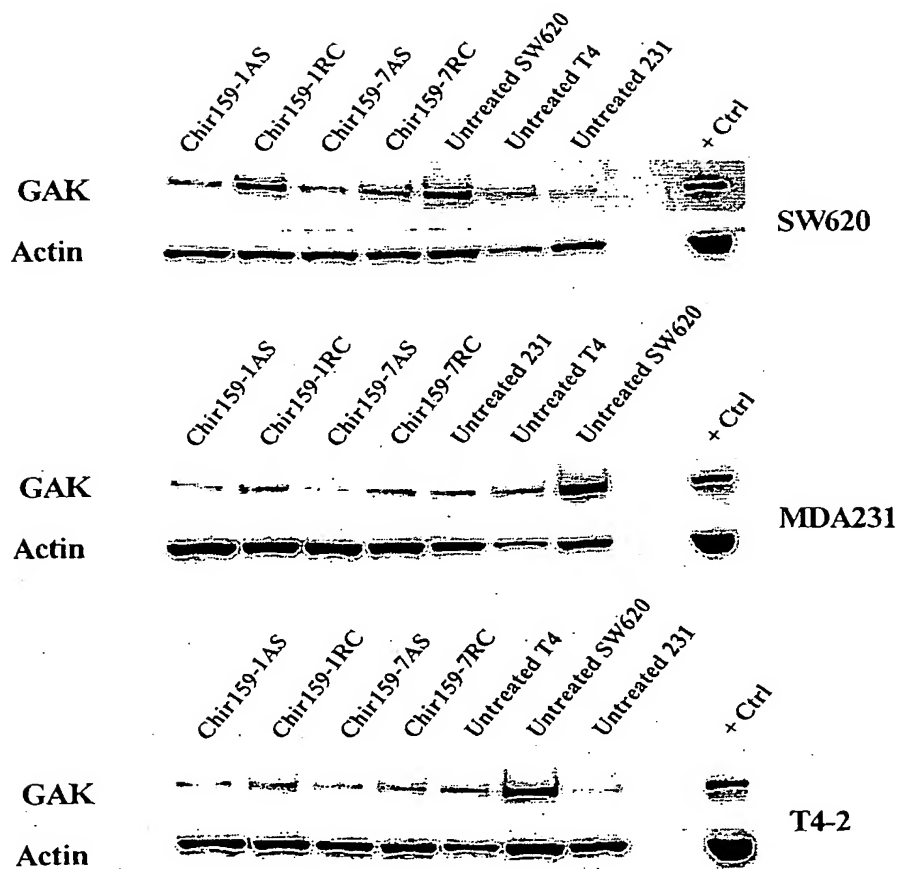
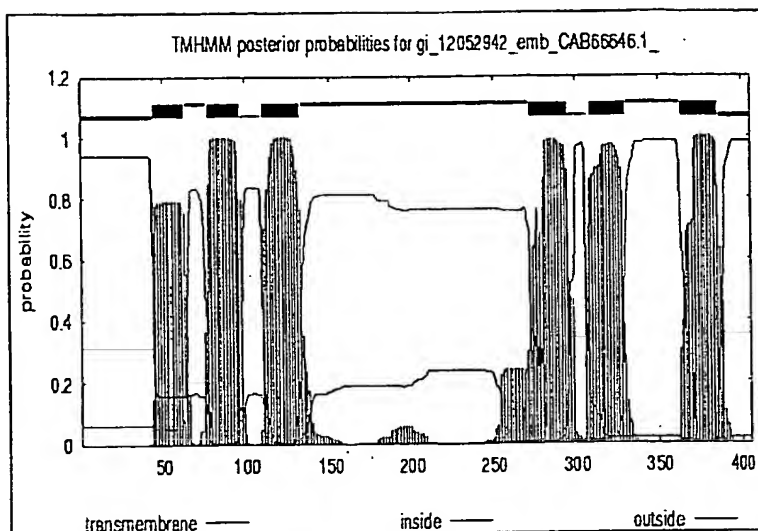


FIG. 1

10/501187



CBS Prediction Server for Transmembrane Proteins

gi_12052942_emb_CAB66646.1 Length: 406
 # gi_12052942_emb_CAB66646.1 Number of predicted TMHs: 6
 # gi_12052942_emb_CAB66646.1 Exp number of AAs in TMHs: 132.21029
 # gi_12052942_emb_CAB66646.1 Exp number, first 60 AAs: 13.48568
 # gi_12052942_emb_CAB66646.1 Total prob of N-in: 0.94086
 # gi_12052942_emb_CAB66646.1 POSSIBLE N-term signal sequence

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 gi_12052942_emb_CAB66646.1_TMHHM2.0TMhelix 44 63
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FIG. 2

10/501187

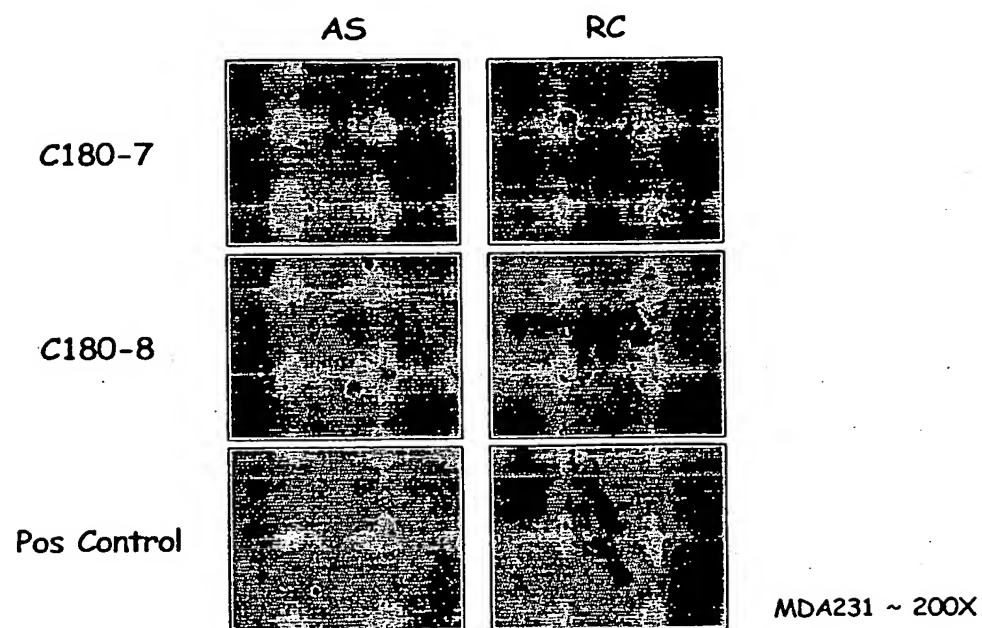


FIG. 3

10/501187

935 984
VMP1 (935) TGGATAACGTGTGGACACTTTCTGGIACCTTTTTGGACCTTCTTTGGTG
22793 (1) -AGAAITTCAGCAGTTCTCTGATTTTATATTTTATT-CCCTCTCCTATC
26883 (1) ---TACAAAGAGCTAACCTCACACTCACTCCACTCTAAAC--TAGTGAAT
Consensus (935) GAATAACAGCTG CTCT ACT TACCTTTTT ACCTT T TGAT
985 1034
VMP1 (985) CAA-CCCTAATTGGAAAAGCAATAATAAAATGCATATCCAGAAAATTTT
22793 (49) CAATCCCTGCCCTTTTGGTCCAGGTGGTAAGTACATTTCTTAAACGTTT
26883 (46) CAA-CACTGATTTTACATCCAAACAAAGTGAATCTTGATAGTTGGGTCTA
Consensus (985) CAA CCCTGATTTTA A CAA AA GTAAAT CAT TTC TTA TTTT
1035 1084
VMP1 1034) TGTATATAAACATTCAGCAAGCA-FACTG----GAGCAATCTGGC
22793 (99) TTCCTGCTTTCTTCCCAATGTGTC-TTTTCTTTCCCTACCTGACCC
26883 (95) AAAAGTAGAGTAAGGAGATTTTCAAGTACTTGGGGTTCTTACTTTCA
Consensus (1035) T GA T TCAT CAGAATGCA A TAGTT G GCTAATGTT CC
1085 1134
VMP1 (1079) TTTCAATTGGTGGCTGTGCCCCGGCATAGCTCCATCTCTGCAGAAAGCCATTTC
22793 (148) TGGCTCCAGTCTGTGCCCCGGCATAGCTCCATCTCTGCAGAAAGCCATTTC
26883 (145) TTT--TTAATTCTTTAGGTTTTGTAACTACAGAGTTCA--AGC-ATTAT
Consensus (1085) TTT TTAGTGCTGTCCCCGGCATAGGTCCATCTCTGCAGAAAGCCATTTC
1135 1184
VMP1 1129) AGGAGTACCTGGAGGCTCAACGGCA-----GAAGC-TTCAGCAGAAAGC
22793 (198) AGGAGTACCTGGAGGCTCAACGGCA-----GAAGC-TTCAGCAGAAAGC
26883 (190) AGATGATCTCTTTTTTACTGTCTAACTAATGAAGCCTTTTTCATTGCAATT
Consensus (1135) AGGAGTACCTGGAGGCTCAACGGCA GAAGC TTCACCACAAAGC
1185 1234
VMP1 1173) GAAATGGGCACA---CCACAGGGAGAAAAGTGGTTGTCTCTGGATGTTTGA
22793 (242) GAAATGGGCACA---CCACAGGGAGAAAAGTGGTTGTCTCTGGATGTTTGA
26883 (240) GTTCTGCAATTTATTTTCTACAGGGAGAAAAGTGGTTGTCTCTGGATGTTTGA
Consensus (1185) GAAATGGGCACA CCACAGGGAGAAAAGTGGTTGTCTCTGGATGTTTGA
1235 1284
VMP1 (1220) AAAGTTCGGTGGTGTGATGGTGTGTTAGTTTCATCTCTATCATTAAGT
22793 (289) AAAGTTCGGTGGTGTGATGGTGTGTTAGTTTCATCTCTATCATTAAGT
26883 (290) AAAGTTCGGTGGTGTGATGGTGTGTTAGTTTCATCTCTATCATTAAGT
Consensus (1235) AAAGTTGGTGGTGTGATGGTGTGTTACTTCATCTCTATCATTAAGT
1285 1334
VMP1 (1270) CCATGGCACAAGTTATGGCAATCCAGCAGCGGTTGAAGTCAAG
22793 (339) CCATGGCACAAGTTATGGCAATCCAGCAGCGGTTGAAGTCAAG
26883 (340) CCATGGCACAAGTTATGGCAATCCAGCAGCGGTTGAAGTCAAG
Consensus (1285) CCATGGCACAAGTTATGGCAATCCAGCAGCGGTTGAAGTCAAG
1335 1384
VMP1 (1320) GAGAAACTAAATAAGTAGAGAAAGTTTAAACTGCAGAAATTGGAGTGG
22793 (389) GAGAAACTAAATAAGTAGAGAAAGTTTAAACTGCAGAAATTGGAGTGG
26883 (375) -----
Consensus (1335) GAGAAACTAAATAAGTAGAGAAAGTTTAAACTGCAGAAATTGGAGTGG
1385 1434
VMP1 1370) ATGGGTTCTGCCTTAATTGGGAGGACTCCAAGCCGGGAAGGAAATTC
22793 (439) ATGGGTTCTGCCTTAATTGGGAGGACTCCAAGCCGGGAAGGAAATTC
26883 (375) -----
Consensus (1385) ATGGGTTCTGCCTTA ATTGGGAGGACTCCAAGCCGGGAAGGAAATTC
1435 1467
VMP1 1420) CTTTTCCAACCTGTATCAATTTTTTACAACTTTT
22793 (489) CTTTT-----
26883 (375) -----
Consensus (1435) CTTTT

FIG. 4

Spot 22793 mapped to VMP1

VMP1: 1087 gtgctgtccccggcataggtccatctctgcagaagccatttcaggagtagctggaggctc 1146
|||||
22793: 156 gtgctgtccccggcataggtccatctctgcagaagccatttcaggagtagctggaggctc 215
|||||
VMP1: 1147 aacggcagaagcttcaccacaaaagcgaaatgggcacaccacagggagaaaaactggttgt 1206
|||||
22793: 216 aacggcagaagcttcaccacaaaagcgaaatgggcacaccacagggagaaaaactgcttgt 275
|||||
VMP1: 1207 cctggatgtttgaaaagttggtcgttgatggtgtgttacttcctatctatcatta 1266
|||||
22793: 276 cctggatgtttgaaaagtcggtcgatggtgtgttacttcctatctatcatta 335
|||||
VMP1: 1267 actccatggcacaaagttatgccaaacgaatccagcagcggttgaactcagaggagaaaa 1326
|||||
22793: 336 actccatggcacaaagttatgccaaacgaatccagcagcggttgaactcagaggagaaaa 395
|||||
VMP1: 1327 ctaaataagtagagaaagttttaaaactgcagaaattggagtggtggttctgccttaaa 1386
|||||
22793: 396 ctaaataagtagagaaagttttaaaactgcagaaattggagtggtggttctgccttata 455
|||||
VMP1: 1387 ttgggaggactccaagccgggaaggaaaaattccctttt 1424
|||||
22793: 456 ttgggaggactccaagccgggaaggaaaaattccctttt 493
|||||

Spot 27450 mapped to VMP1

VMP1: 2330 tgtgttaatgttttctagcatgtactctggtttcaacagacacaaatttatatgttaacc 2389
|||||
27450: 1 tgtgttaatgttttctagcatgtactctggtttcaacagacacaaatttatatgttaacc 60
|||||
VMP1: 2390 cagttttcttgccgttctgtaagtgttttattcttagtgatgtttttccattgggatg 2449
|||||
27450: 61 cagttttcttgccgttctgtaagtgttttattcttagtgatgtttttccattgggatg 120
|||||
VMP1: 2450 tttttgattgaacttggttcattttgttttgcttgggaggaaaaataaacaattttactttt 2509
|||||
27450: 121 tttttgattgaacttggttcattttgttttgcttgggaggaaaaataaacaattttactttt 180
|||||
VMP1: 2510 ttcctt 2515
|||||
27450: 181 ttcctt 186
|||||

Spot 26883 mapped to VMP1

VMP1: 1187 acaggagagaaaaactggttgctcctggatgtttgaaaagttgggtcgttgatggtgtgtta 1246
|||||
26883: 257 acaggagagaaaaactggttgctcctggatgtttgaaaagttgggtcgttgatggtgtgtta 316
|||||
VMP1: 1247 cttcatcctatctatcattaactccatggcacaaagttatgccaaacgaatccagcag 1304
|||||
26883: 317 cttcatcctatctatcattaactccatggcacaaagttatgccaaacgaatccagcag 374
|||||

FIG. 5

SEQUENCE LISTING

10/501187

DT04 Rec'd PCT/PTO 08 JUL 2004

<110> Hansen, Rhonda

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IN CANCEROUS BREAST CELLS AND THEIR METHODS OF USE

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 cctactttttc aagagtgcag ttgattctga atctgaaagc ccgcctctgt cctaaaatac 120
 aaacaagcac agacattaaa cctggatact atatgataaa gagggatgta actattgaat 180
 tggatacaag gatcagaatg gaaagaaact cacgatgaaa ttgaacctgg tttttgtata 240
 tttatcaaac ttgtgctgag aatagtgtct gattatacga cttttaagca aagttgggtg 300
 taattaggtg aaaacagccc aggtcctccc gggagcacag aggggctagg ggctggctct 360
 tctcgtttgc tctagtcttg ctttgctgtc tgggtgtagc cctctgctgc tcccatctgc 420
 actaattgac 430

<210> 9
 <211> 493
 <212> DNA
 <213> Homo sapiens

<400> 9
 ctcactattt ggaatttggc cctcgaggcc aagaattcgg cacgaggcgg cacgaggtgt 60
 aactattgaa ttggatacaa ggatcagaat ggaaagaaac tcacgatgaa attgaacctg 120
 gtttttgtat atttatcaaa cttgtgctga gaatagtgtc tgattatacg acttttaagc 180
 aaagttgggt gtaattaggt gaaaacagcc caggtcctcc cgggagcaca gaggggctag 240
 gggctgggtc ttctcgtttg ctctagtctt gctttgctgt ctggtgtagc tctctgctg 300
 ctcccatctg cactaattga cccaaaacgt gggattttcc tgctacacaa aagccaaaag 360
 gtttcatgta gatttttagt cactaaaggg tgccacaaa atagagatta attttaactt 420
 aaattttaag cttgaagatt aggtactatc tgtgaagtta cacttttttt ttttttttaa 480
 aaggaaaaaa tgt 493

<210> 10
 <211> 472
 <212> DNA
 <213> Homo sapiens

<400> 10
 cggcacgagg tgtaactatt gaattggata caaggatcag aatggaaaga aactcacgat 60
 gaaattgaac ctggtttttg tatattttatc aaacttgtgc tgagaatagt gtctgattat 120
 acgactttta agcaaagttg ggtgtaatta ggtgaaaaca gccaggtcc tcccgggagc 180
 acagaggggc taggggctgg tccttctcgt ttgctctagt cttgctttgc tgtctggtgt 240
 agtcctctg ctgctcccat ctgcactaat tgacccaaaa cgtgggtatt tctgtctaca 300
 caaaagccaa aaggtttcat gtagatttta gttcactaaa gggtgccac aaaatagaga 360
 ttaattttta cttaaatttt aagcttgaag attaggtact atctgtgaag ttacactttt 420
 ttattttttt ttaaaggtag agatgtgtgt gtgtgtaggt attaaagatg tg 472

<210> 11
 <211> 271
 <212> DNA
 <213> Homo sapiens

<400> 11
 gtttttcttt tttttatata caacatttat ttcaaactat tgggagggat gagagtggct 60
 taaaaacttc catcctact tttcaagagt gcagttgatt ctggggggga aagcccgctt 120
 ctgtcctaaa atacaaacaa gcacagacat taaacctgga tactatatga taaagaggga 180
 tgtaactatt gaattggata caaggatcag aatggaaaga aactcacgat gaaattgaac 240
 ctggtttttg tatattttatc aaacttgtgc t 271

<210> 12
 <211> 343
 <212> DNA

<213> Homo sapiens

<400> 12

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gtttttcttt tttttataca caacatttat ttcaaactat tgggagggat gagagtggct 60
taaaaacttc catccctact ttccacqagt gcagctgatt ctgaatctga aagcccgccct 120
ctgtcctaaa atacaaacac gcacagacat tagacctgga tactatatga tacagaggga 180
tgtaactatt gaattggata cacggatcac aatggaaaga aactcacgat gaaattgaac 240
ctggcttttg tatatttatc aaacttggtc tgagaatagc gcctgattat acgactttta 300
agcaaagctg ggtgtaatta ggtgaaaaca gccacgtcc tcc 343
```

<210> 13

<211> 345

<212> DNA

<213> Homo sapiens

<400> 13

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agtggcgagc aggttcccac ttgccaaaga tcccttttaa ccaacactag cccttggtttt 60
taacacacgc tccagccctt catcagcctg ggcagtctta ccaaaatgtt taaagtgatc 120
tcagaggggc ccatggatta acgccctcat cccaagggtc gtcccatgac ataacactcc 180
acacccgccc cagccaactt catgggtcac tttttctgga aaataatgat ctgtacagac 240
aggacagaat gaaactcctg cgggtctttg gcctgaaagt tgggaatggg tgggggagag 300
aagggcagca gcttattggt ggtcttttca ccattggcag aaacg 345
```

<210> 14

<211> 401

<212> DNA

<213> Homo sapiens

<400> 14

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ttttccaagt ccgtttcagt cccttccttg gtctgaagaa attctgcagt ggcgagcagt 60
ttcccacttg ccaaagatcc cttttaacca acactagccc ttgtttttta cacacgctcc 120
agcccttcat cagcctgggc agtcttacca aaatgtttta agtgatctca gaggggcccc 180
tggattaacg cctcatccc aaggtccgtc ccatgacata aactccaca cccgccccag 240
ccaacttcat gggtcacttt ttctggaaaa taatgatctg tacagacagg acagaatgaa 300
actcctgcgg ctctttggcc tgaaagtggg gaatggttgg gggagagaag ggcagcagct 360
tattggtggt cttttcacca ttggcagaaa cagtgaagac t 401
```

<210> 15

<211> 442

<212> DNA

<213> Homo sapiens

<400> 15

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ggcagccggc ccacatgtct ctcaagtacc tgtccctcg ctctgggtgat tatttcttgc 60
agaatcacca cagagacca tcccggcagt catggttttg ctttagtttt ccaagtcctg 120
ttcagtcctt tccttgggtc gaagaaattc tgcagtggcg agcagtttcc cacttgccaa 180
agatcccttt taaccaacac tagcccttgt ttttaacaca cgctccagcc cttcatcagc 240
ctgggcagtc ttaccaaagt gtttaaagt atctcagagg ggcccatgga ttaacgccct 300
catcccaagg tccgtcccat gacataaac tccacaccgg cccagccaa cttcatgggt 360
cactttttct ggaaaataat gatctgtaca gacaggacag aatgaaactc ctgcggctct 420
ttggcctgaa agtgggaatg gt 442
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<210> 16

<211> 256

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> 96

<223> n = A, T, C or G

<400> 16

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gaatatgtag atttgcttct taatcctgag cgctacactg gttacaaggg accagatgct 60
tggaataat ggaatgtcat ctacgaagaa aactgnntta agccacagac cattaataa 120
ccttaaatcc tttggcttct ggtcaagggg caagtgaaga gaacactttt tacagttggc 180
tagaagggtc ctgtgtagaa aaaagagctt ctacagactt atatctggcc tacatgcaag 240
ccattaatgt gcattt 256

```

<210> 17

<211> 405

<212> DNA

<213> Homo sapiens

<400> 17

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attctgtgat ttatttgaaa ctgtgaaacc atgtgccata atagaatttt gagaattttg 60
cttttaccta aattcaagaa aatgaaatta cacttttaag ttagtggtgc ttaagcataa 120
tttttcctat attaacagt attaaaatct caagtaagat tttccagtgc cagaacatgt 180
taggtggaat tttaaaagt cctcggcatc ctgtattaca tgcatagaa ttgtaaagtc 240
aacatcaatt actagtaatc attctgcact cactgggtgc atagcatggt tagaggggct 300
agagatggac agtcatcaac tggcggatat agcggtagat atgaccta gccaccagg 360
cacaagctta ccagtagaca atacagacag agcttttgtt gagct 405

```

<210> 18

<211> 447

<212> DNA

<213> Homo sapiens

<400> 18

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tgtgatttca tttgaaactg tgaaaccatg tgccataata gaattttgag aattttgctt 60
ttacctaaat tcaagaaaat gaaattacac ttttaagtta gtggtgctta agcataattt 120
ttcctatatt aaccagtatt aaaatctcaa gtaagatttt ccagtgccag aacatgttag 180
gtggaatttt aaaagtgcct cggcatcctg tattacatgt catagaattg taaagtcaac 240
atcaattact agtaatcatt ctgcactcac tgggtgcata gcatgggttag aggggctaga 300
gatggacagt catcaactgg cggatatagc ggtacatatg atccttagcc accagggcac 360
aagcttacca gtagacaata cagacagagc ttttgttgag ctgtaactga gctatggaat 420
agcttctttg atgtacctct ttgcctt 447

```

<210> 19

<211> 294

<212> DNA

<213> Homo sapiens

<400> 19

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tgtgatttca tttgaaactg tgaaaccatg tgccataata gaattttgag aattttgctt 60
ttacctaaat tcaagaaaat gaaattacac ttttaagtta gtggtgctta agcataattt 120
ttcctatatt aaccagtatt aaaatctcaa gtaagatttt ccagtgccag aacatgttag 180
gtggaatttt aaaagtgcct cggcatcctg tattacatgt catagaattg taaagtcaac 240
atcaattact agtaatcatt ctgcactcac tgggtgcata gcatgggttag aggg 294

```

<210> 20

<211> 562

<212> DNA

<213> Homo sapiens

<400> 20

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aggagcaggt tggactggcc atccgaagca agattgcaga tggcagtgtg aagagagaag 60
acatattcta cacttcaaag ctttggagca attcccatcg accagagttg gtccgaccag 120
ccttggaag gtcactgaaa aatcttcaat tggactatgt tgacctctat cttattcatt 180
ttccagtgtc tgtaaagcca ggtgaggaag tgatcccaaa agatgaaaat ggaaaaatac 240
tatttgacac agtggatctc tgtgccacat gggaggccat ggagaagtgt aaagatgcag 300
gattggccaa gtccatcggg gtgtccaact tcaaccacag gctgctggag atgacctca 360
acaagccagg gctcaagtac aagcctgtct gcaaccaggt ggaatgtcat ccttacttca 420
accagagaaa actgctggat ttctgcaagt caaaagacat tgttctggtt gcctatagtg 480

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ctctggggtc ccatcgagaa gaaccatggg tggacccgaa ctccccggtg ctcttggagg 540
 acccagtcct ttgtgccttg gc 562

<210> 21
 <211> 721
 <212> DNA
 <213> Homo sapiens

<220>
 <221> misc_feature
 <222> 626, 685, 696
 <223> n = A,T,C or G

<400> 21
 ggcacgagat gaggagcagg ttggactggc catccgaagc aagattgcag atggcagtgt 60
 gaagagagaa gacatattct acacttcaaa gctttggagc aattcccatc gaccagagtt 120
 ggtcccagacc agccttggaa aggtcactga aaaatcttca attggactat gttgacctct 180
 atcttattca ttttccagtg tctgtaaagc cagggtgagga agtgatccca aaagatgaaa 240
 atggaaaaaat actatttgac acagtggatc tctgtgccac atgggaggcc atggagaagt 300
 gtaaaagatgc aggattggcc aagtccatcg ggggtgccaa cttcaaccac aggctgctgg 360
 agatgatcct caacaagcca gggctcaagt acaagcctgt ctgcaaccag gtggaatgtc 420
 atccttactt caaccagaga aaactgctgg atttctgcaa gtcaaaagac attgttcttg 480
 ttgcctatag tgctctggga tcccatcgag aagaacccatg ggtggaccgg aactccccgg 540
 tgctcttggg ggacccagtc ctttgtgcct tggcaaaaaa gcacaagcga accccaccct 600
 gattgccctg cgctaccagc ttgcancgtg gggttgtggt cctggccaag agcttcaatg 660
 agcacgcatc agacagaacg tgcangtggt tgaatncagt tgacttcaga aggagatgaa 720
 a 721

<210> 22
 <211> 496
 <212> DNA
 <213> Homo sapiens

<400> 22
 agatgataac cagaagtctg catttgaagt tcacaaaagt aatcaagctc aaacagttag 60
 tgagagggcag aagaacagac ctaaattctt taaaaaagga aaaaatatta ggggaagatga 120
 tcctgtaaga atgttgcaaa ctggtgcaaa gaaattcgac ttcagtaatt tgagtagtag 180
 gttagatgga gtcagatttg aaaatgaaaa aaattaatgt tattgccaaag aacactggta 240
 ataaactgaa gctaagtcag aaaaaatggt tgtttgctag atcccaatgg agaaaagtgt 300
 gtaactgctc ctcgtcaggt ctctgctctt caccataaag acattgctct gtctttgggt 360
 gctgcaagtg atggagctac agtctgtgtt accacaaggg gagatattta cttacttgca 420
 gactatcagt gcaagaagat ggcttctaaa cagttgaact tgaaaaaagt tcttgtgtct 480
 gggggtcata tggaat 496

<210> 23
 <211> 549
 <212> DNA
 <213> Homo sapiens

<400> 23
 ctgcatttga agttcacaaa agtaatcaag ctcaaacagt tagtgagagg cagaagagca 60
 gacctaaatc ttgtaaaaaa ggaaaaaata ttagggaaga tgatcctgta agaattgttc 120
 aaactgttgc aaagaaattc gacttcagta atttgagtag taggttagat ggagtcagat 180
 ttgaaaaatga aaaaaattaa tggtattgcc aagaacactg gtaataaact gaagctaagt 240
 cagaaaaaat ggttgtttgc tagatcccaa tggagaaaag tgtgtaactg ctctcgtca 300
 ggtctctgct cttcaccata aagacattgc tctgtctttg gttgctgcaa gtgatggagc 360
 tacagtctgt gttaccacaa ggggagatat ttacttactt gcagactatc agtgcaagaa 420
 gatggcttct aaacagttga acttgaaaaa agttcttgtg tctgggggtc atatggaata 480
 caagggttgat cctgaacatt tgaaagaaaa tgggggtcaa aaaatttgca ttcttgcaat 540
 ggatggagc 549

<210> 24

<211> 55
 <212> DNA
 <213> Homo sapiens

<400> 24
 gtgtctgcct tcacaaatgt cattgtctac tcctagaaga accaaatacc tcaat 55

<210> 25
 <211> 498
 <212> DNA
 <213> Homo sapiens

<400> 25
 tccttattta ttttaacttca cccgagttcc tctgggtttc taagcagtta tgggtgatgac 60
 ttagcgtcaa gacatttgct gaactcagca cattcgggac caatatatag tgggtacatc 120
 aagttcatct gacaaaatgg ggcagaagag aaaggactca gtgtgtgatc cggtttcttt 180
 ttgtctgccc ctgttttttg tagaatctct tcatgcttga catactacc agtattattc 240
 ccgacgacac atatacatat gagaatatac cttattttatt tttgtgtagg tgtctgcctt 300
 cacaaatgtc attgtctact cctagaagaa ccaaatacct caatttttgt ttttgagtac 360
 tgtactatcc tgtaaataata tcttaagcag gtttgttttc agcactgatg gaaaatacca 420
 gtgttggtt tttttttagt tgccacagtt gtatgtttgc tgattattta tgacccgaaa 480
 aatatatttc ttctccta 498

<210> 26
 <211> 325
 <212> DNA
 <213> Homo sapiens

<400> 26
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 tgtggggggg ggagatgaaa ctgcggttct ccaccaggag gcaagcaagc agcagccact 120
 gcagtcagag caacagctgg cccagttgac acaacagctg gcccagacag agcagcacct 180
 gaacaacctg atggcccagc tggacccct ttttgagccg tgtgactact ctggctggag 240
 cccagcagga gcttctgaac atgaagctat ggaccatcca cgagctgctg caagatagca 300
 agccggacaa ggtatggag gcttc 325

<210> 27
 <211> 166
 <212> DNA
 <213> Homo sapiens

<400> 27
 gaatccagca tcttaaagtt gcatatgtgt agcactaatg tttcttttta aatagttggg 60
 ggaaaatgac ctagaaaacc aaattgcagt ttggtagcca aaattaactc ttggtttatt 120
 tgtcctttgt gtgtgaaaag tcctactatt ccgtgcgtca gacttc 166

<210> 28
 <211> 501
 <212> DNA
 <213> Homo sapiens

<400> 28
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 tcggagagaa ccaggaatgg cggagtgtct aacagcagcg cgggtagtgt tgatgccgtg 120
 aatgcaggac catccaggtc ctcaaagtct gcgaggtttg ttcataatcc caaacaaggg 180
 ccctgctggc agcaacagga caggtggggc caggacaggg aagctggagc aggaggccag 240
 tgtcttttggg ggctgtggca gggccgctg cctggggttc ccttactcat ctggtagttc 300
 atgcaggcca cggccctcat ctcccaggaa cgggccatgg ggcgagtcca ctggtgcca 360
 gtaacaccct ccgtgggacc accttgggaa gcatgtgccg cggagtccac cacggggggg 420
 cctgggtccc gggagggtc cttctgcgtg ctggccatgt cgtgccgcac ggcctgagga 480
 caggaggtag aggtgagcac c 501

<210> 29
 <211> 149
 <212> DNA
 <213> Homo sapiens

<400> 29
 cgtccccggag gtgcgggtgtg gggcaccggg cggggccgcg ggaaccggcg cccacaggag 60
 ctgctgctgt cagaccaacc ccgggcccc atcatcactg cggcgcgctt tcaggcgccg 120
 agaactaccg ttcccggcat gccatgaaa 149

<210> 30
 <211> 475
 <212> DNA
 <213> Homo sapiens

<400> 30
 agcagtaaac agggctgcta tgcctgctct gtagtggtgg acggcgaagt aaagcattgt 60
 gtcataaaca aaacagcaac tggctatggc tttgccgagc cctataactt gtacagctct 120
 ctgaaagaac tgggtgctaca ttaccaacac acctcccttg tgcagcacia cgactccctc 180
 aatgtcacac tagcctaccc agtatatgca cagcagaggc gatgaagcgc ttactctttg 240
 atccttctcc tgaagttagc ccaccctgag gcctctggaa agcaaagggc tcctctccag 300
 tctgatctgt gaattgagct gcagaaacga agccatcttt ctttggatgg gactagagct 360
 ttctttcaca aaaaagaagt aggggaagac atgcagccta aggctgtatg atgaccacac 420
 gttcctaagc tggagtgtt atcccttctt tttctttttt tctttggttt aattt 475

<210> 31
 <211> 570
 <212> DNA
 <213> Homo sapiens

<400> 31
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 aaaatgaata ttaacaaaaa tccgggacaa caatatcttc aagcaacaaa aactgggggtg 120
 gggaagctta ttctgaaggc acatttaaaa ctgaaataac aacttaatga aaattaagaa 180
 ttgcatagcg ctgtgaattt agccttcagc aaaacaaaac agaagctatt tggatttgat 240
 acaaatccat ctatttgata gttagtcac ccaatattatg tacatatctt atatactgaa 300
 tgtcatttta agtcctgttt tccaaactcc atttttctgt tgctgggttt ttgttttttg 360
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 gacattctcc caaagcgtcc cttgtgagtg gacgcgcctt tctgctacat atcgctcatt 480
 tgttacaaaa tgaaataatc cacagtgcga tgtgtctggg tccaccgtgc acagcaacat 540
 ccaggctaaa ccaggctgga ccaaaccttc 570

<210> 32
 <211> 645
 <212> DNA
 <213> Homo sapiens

<400> 32
 tccgagcgtc gggagcctgt ggaagagaag agcgcgcggg cgacagttaa acaggcccga 60
 ggcagagaaa ccgccctagc agctctcgcg cgcccggtgc aggcggcggt tgctgaggag 120
 gtccgtgcac agactgcttt gcctgttggt gctcttcgga ggcggcgatc cccgaaggcg 180
 agctgaaata cggctgcagg ctacaatttg cagccgacga ttaaggaaga cgacgagcgg 240
 gagaggtggc ccaccctcat ggagcgcttg tgctcgatg gcttcgcatt tcccattac 300
 tacatttaac cgtatcatct gaagaggatc cacagagctg tcttacgtgg taatctggag 360
 aaactgaagt accttctgct cacgtattat gacgccaata agagagacag gaaggaaagg 420
 actgccctac atttgccctg tgccactggc caaccggaaa tggtagatct cctgggtgtcc 480
 agaagatgtg agcttaacct ctgcgaccgt gaagacagga cacctctgat caaggctgta 540
 caactgaggc aggaggcttg tgcaactctt ctgctgcaaa tggcgccgat ccaaatatta 600
 cggatgtctt tgggaaggact gctctgcact acgctgtgta taatg 645

<210> 33
 <211> 572

<212> DNA

<213> Homo sapiens

<400> 33

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ctaactgagt aacattcatg aaatgaggct ttctgtggcg gcgtagtggt tgggaattaga 60
aggtaattca gtagagtgtg acttagagaa tattgcaagt gacacattga atcctgcccg 120
tcagggcacc ttttcctcag agcaatccgg ccacacgaat agaaggctgt cgtgaatcac 180
atcagatgta aaatcattcc ttctgtttac tcttttaatt ttcattcctt gcaggtagtg 240
caaattcaac ttcaaatatg gtgtaggttt tgctagattc catatttttt tcttggattt 300
ttgctaatta tttttagcaa aaaatttttg ctgagtggca ccctccctag tgtccatggg 360
ttagggccat gctggggaaa acgggcccgt atttacacac gcgcaaaaca cccagagacg 420
gcacaaggag gttgaactca tgtttcagtt cgcgaacatt gactccttac gaaagtcaact 480
tcattctaac tagatgcgcc cacttctggt cattatttcg tttgcatgat gtattgcttc 540
ttcacgtttt gtttttattg agcacggagt ag                                     572

```

<210> 34

<211> 701

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

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<222> 34, 41, 43, 52, 58, 72, 180, 204, 205, 211, 214, 228, 243,
253, 269, 271, 295, 315, 343, 429, 439, 457, 483, 517, 529,
546, 554, 555, 557, 560, 561, 565, 627, 632, 637, 644, 655,
659, 662, 672, 680, 689, 690, 698

```

<223> n = A,T,C or G

<400> 34

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ggcacgaggc taactgtgta acatttatga aatntgctct ntntggcggc gnaggggncg 60
gaatgagaag gnaattcagt agagtgtaac ttagagaata ttgcaaggga cacattgaat 120
cctgcccgtc agggcacctt ttcttcagag caatccggcc acacgaatag aaggctgcgn 180
gaatcacatc agatgtaaaa tcannccctc ngnggactct ttttaattntc atcctttgca 240
ggnagggcaa atncaacttc aaatatggng naggttttgc tagattccat atttntttct 300
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ccatgggtta gggccatgct ggggaaaacg ggccggtatt tacacacgcg caaaacaccc 420
agagacggna caaggaggnt gaactcatgt ttcagtncgc gaacattgac tccttacgaa 480
agncacttca ttctaactag atgcgccac ttctggncat tattacgant gcatgaagga 540
ttgctncttc acgnntnggn nttantgagc acgggagtag aaattccagg gctggcttga 600
catcttcctt gcattgtccc tcccagngga cngtccntcc cttncacatg agganctgnc 660
gnccatggtg gnttttctcn ttgggcctnn tgggactnng a                                     701

```

<210> 35

<211> 300

<212> DNA

<213> Homo sapiens

<400> 35

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gctaactgag taacattcat gaaatgaggc tttctgtggc ggcgtagtgt ttggaattag 60
aaggtaattc agtagagtgt aacttagaga atattgcaag tgacacattg aatcctgccc 120
gtcagggcac cttttcctca gagcaatccg gccacacgaa tagaaggctg tcgtgaatca 180
catcagatgt aaaatcattc cttctgttta ctcttttaat tttcattcct tgcaggtagt 240
gcaaattcaa cttcaaatat ggtgtaggtt ttgctagatt ccatattttt ttcttggatt 300

```

<210> 36

<211> 374

<212> DNA

<213> Homo sapiens

<400> 36

```

tggtacgcct gcaggtagcg gtccggaatt cccgggtcga cccacgcgtc cggaggggtc 60

```

```

ctggagaatg ggttacccca gttgtcttat ttaaattggtt acccatcaga ttttaatttt 120
atcttctctt tgagagcttg gtaataagaa gcacttaaat cactccaaag aagactttta 180
aaagggagca gtgaaaaggt ctttaataatt tattgattga attaagaaat actagcta 240
taagaatctg agtctaaaca gcacagattt tttctttctg cttttaaatt gtgttttaaa 300
aaaagagaca gggggctggg cgtggtggct cagcctgta atcctagcac tttgggaggc 360
cgaggcggtt ggat 374

```

<210> 37
 <211> 290
 <212> DNA
 <213> Homo sapiens

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<400> 37
gaggggtcct ggagaaatgg gttaccccag ttgtcttatt taaatgggta cccatcagat 60
tttaatttta tcttctcttt gagagcttgg taataagaag cacttaaatc actccaaaga 120
agacttttaa aagggagcag tgaaaaggtc ttaataattt attgattgaa ttaagaaata 180
ctagctaatt aagaatctga gtctaaacag cacagatttt ttctttctgc ttttaaattg 240
tgtttttaaa aaagagacag ggggctgggc gtggtggctc acgcctgtaa 290

```

<210> 38
 <211> 405
 <212> DNA
 <213> Homo sapiens

```

<400> 38
gccctttcga gcgcccgccc gggcaggtac ctgggattac aggcaccac caccacgcct 60
ggctaatttt tttttgtatc ttttagtagg ttttgccatg ttggccaggc tggcttttaa 120
ctcctacctc gtgatccacc cgcctcggcc ccccaaagtg ctaggaccac aggcgtgagc 180
caccacgccc agccccctgt ctcttttttt aaaacacaat ttaaaagcag aaagaaaaaa 240
tctgtgctgt ttagactcag attcttaatt agctagtatt tcttaattca atcaataaat 300
tattaagacc ttttcaactgc tcccttttta aagtcttctt tggagtgtatt taagtgtctc 360
ttattaccaa gctctcaaag agaagataaa attaaaatct gatgg 405

```

<210> 39
 <211> 736
 <212> DNA
 <213> Homo sapiens

<220>
 <221> misc_feature
 <222> 2, 3, 4, 5, 6, 7, 8, 9, 14, 15, 16, 17, 18, 19, 20, 21, 22,
 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36,
 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50,
 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64,
 65
 <223> n = A,T,C or G

<221> misc_feature
 <222> 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80,
 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94,
 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107,
 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118
 <223> n = A,T,C or G

<221> misc_feature
 <222> 119, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136,
 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148,
 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160,
 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171
 <223> n = A,T,C or G

<221> misc_feature

<222> 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683,
684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695,
696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707,
708, 709, 710, 711, 712, 713, 714, 729, 736
<223> n = A,T,C or G

<400> 39

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gnnnnnnnnna gacnnnnnnnn nnnnnnnnnnn nnnnnnnnnnn nnnnnnnnnnn nnnnnnnnnnn 60
nnnnnnnnnnn nnnnnnnnnnn nnnnnnnnnnn nnnnnnnnnnn nnnnnnnnnnn nnnnnnnnnna 120
cctgggatta caggcaccca ccaccacgcc tggctaattt ttttttgtat ctttagtagg 180
gttttgccat gttggccagg ctggctctta actcctacct cgtgatccac ccgcctcggc 240
ccccaaagt gctaggacca caggcgtgag ccaccacgcc cagccccctg tctctttttt 300
taaaacacaa tttaaaagca gaaagaaaaa atctgtgtctg tttagactca gattcttaaat 360
tagctagtat ttcttaattc aatcaataaa ttattaagac cttttcactg ctcccttttt 420
aaagtcttct ttggagtgat ttaagtgtct cttattacca agctctcaaa gagaagataa 480
aattaaaatc tgatgggtaa ccatttaaat aagacaactg gggtaaccca tttctccagg 540
accctctctc gcaacagaga gctattctct tttttggcc tagtaaacct ctgctcttaa 600
ccttttaaaaa aaaaaaaaaa gtaccnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 660
nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnncatagt 720
ggttcctgng tgaaan 736

```

<210> 40

<211> 725

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 15, 16, 17, 18, 19, 20,
21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34,
35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48,
49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62,
63

<223> n = A,T,C or G

<221> misc_feature

<222> 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78,
79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92,
93, 94, 95, 96, 97, 98, 605, 606, 607, 608, 609, 610, 611,
612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623

<223> n = A,T,C or G

<221> misc_feature

<222> 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635,
636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647,
648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659,
660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670

<223> n = A,T,C or G

<221> misc_feature

<222> 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682,
683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694,
695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706,
707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717

<223> n = A,T,C or G

<400> 40

```

gnnnnnnnnnn annnnnnnnnn nnnnnnnnnnn nnnnnnnnnnn nnnnnnnnnnn nnnnnnnnnnn 60
nnnnnnnnnnn nnnnnnnnnnn nnnnnnnnnnn nnnnnnnnnnn nnnnnnnnnnn nnnnnnnnnnn 120
caccacgcct ggctaatttt tttttgtatc ttttagtagg ttttgccatg ttggccaggc 180
tggtctttaa ctctaccctc gtgatccacc cgctcgggcc ccccaaagtg ctaggaccac 240
aggcgtgagc caccacgccc agccccctgt ctcttttttt aaaacacaaat ttaaaagcag 300

```

```

aaagaaaaaa tctgtgctgt ttagactcag attcttaatt agctagtatt tcttaattca 360
atcaataaat tattaagacc ttttcaactgc tcccttttta aagtcttctt tggagtgtatt 420
taagtgtctc ttattaccaa gctctcaaaag agaagataaa attaaaatct gatgggtaac 480
catttaataa agacaactgg ggtaacccat ttctccagga cccctctctg caacagagag 540
ctattctctt tctttggcct agtaaaqctc tgctcttaac ctttaaaaaa aaaaaaaaag 600
taccnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn 660
nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnngt 720
atccg                                             725

```

<210> 41

<211> 474

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> 243, 267

<223> n = A, T, C or G

<400> 41

```

ccggaaaaaa agaaccattt ggatacatag gtatggctctg agctatgata tcaattggct 60
tcctagggtt tatcgtgtga gcacaccata tatttacagt aggaatagac gtagacacac 120
gagcatatct cacctccgct accataatca tcgctatccc caccggcgctc aaagtattta 180
gctgactcgc cacactccac ggaagcaata tgaaatgac tgctgcagtg ctctgagccc 240
tangattcat ctttcttttc accgtangtg gcctgactgg cattgtatta gcaaactcat 300
cactagacat cgtactacac gacacgtact acgttgtagc ccacttccac tatgtcctat 360
caataggagc tgtatttgcc atcataggag gcttcattca ctgatttccc ctattctcag 420
gctacacctt agaccaaaacc tacgccaaaa tccatttcac tatcatattc atcg 474

```

<210> 42

<211> 540

<212> DNA

<213> Homo sapiens

<400> 42

```

cataggatat gtctgagcta tgatatcaat tggcttccca gggtttatcg tgtgagcaca 60
ccatatatct acagtaggaa tagacgtaga cacacgagca tatttcacct ccgctaccat 120
aatcatcgct atccccaccg gcgtcaaagt atttagctga ctgcgccacac tccacggaag 180
caatatgaaa tgatctgctg cagtgtctctg agccctagga ttcactcttc ttttcaccgt 240
aggtggcctg actggcattg tattagcaaa ctcatcacta gacatcgtae tacacgacac 300
gtactacgtt gtagcccaact tccactatgt cctatcaata ggagctgtat ttgccatcat 360
aggaggcttc attcactgat ttcccctatt ctgaggctac accctagacc aaacctacgc 420
caaaatccat ttcactatca tattcatcgg cgtaaatcta actttcttcc cacaacactt 480
tctcggccta tccggaatgc cccgacgtta ctcggtactac cccgatgcat acaccacatg 540

```

<210> 43

<211> 587

<212> DNA

<213> Homo sapiens

<400> 43

```

gaccatgagt catttagaat agtgataaat agaatacaca gaatagtgat gaaattcaat 60
ttaaaaaatc acgttagcct ccaaaccatt taattcaaat gaacccatca actggatgcc 120
aactctggcg aatgtaggac ctctgagtgg ctgtataatt gttaattcaa atgaaattca 180
tttaaacagt tgacaaactg tcattcaaca attagctcca gtaaataaca gttatttcat 240
cataaaacag tcccttcaaa cacacaattg ttctgctgaa gagttgtcat caacaatcca 300
atgtcacact attcagttgc tctgtggtea gtgtggctgc atagcagtggt attccatgaa 360
aggagtcatt ttagtgatga gctgccagtc cattcccagg ccaggctgtc gctggccatc 420
cattcagtcg attcagtcac aggcgaatct gttctgcccg aggcttggtg tcaagcaaaa 480
attcagccct gaaatcaggc acatctgttc gttggactaa acccacagg tagttcagtc 540
aaagcaggca acccccttgt gggcactgac cctgccactg gggtcat 587

```


<210> 44
 <211> 622
 <212> DNA
 <213> Homo sapiens

<220>
 <221> misc_feature
 <222> 491, 541, 556, 561, 568, 578, 585
 <223> n = A,T,C or G

<400> 44
 accatgagtc atttagaata gtgataaata gaatacacag aatagtgatg aaattcaatt 60
 taaaaaatca cgtaggcctc caaaccattt aattcaaatg aacccatcaa ctggatgccg 120
 actctggcga atgtaggacc tctgagtggc tgtataattg ttaattcaaa tgaaattcat 180
 ttaaacagtt gacaaactgt cattcaacaa ttagctccag taaataacag ttatttcac 240
 ataaaacagt cccttcaaac acacaattgt tctgctgaag agttgtcatc aacaatccaa 300
 tgctcaacta ttcagttgct ctgtggtcag tgtggctgca tagcgtggga ttccatgaaa 360
 ggagtcattt tagtggtgga gctgccagtc cttcccgggc cgggtgtcgc tgggccatcc 420
 ttcagtcggt tcgtcatagg cgatctgttc tgcccgaggg ttgtggtcag gcaaaattca 480
 gccctgaatt ngggcactct gtctgttggg ctaaaccctc ggtagttca gtcaaggcgg 540
 naaccctctt gtgggnactg ncctggcctt ggggtctnng cggnttggcc gttggggagg 600
 tttggcccca cggcctctgt gg 622

<210> 45
 <211> 340
 <212> DNA
 <213> Homo sapiens

<400> 45
 aaggcaggaa tgtcaggcct ctgagcccaa gccaaagccat cgcateccct gtgacttgca 60
 cgtatacacc cagatggcct gaagtaactg aagaatcaca aaagaagtga aaaggccctg 120
 cccgcctca actgatgaca ttccaccatg gtgatttgtt cctgccccac cttactgag 180
 tgattaaccc tgtgaatttc cttctcctgg ctcagaagct cccccactga gcaccttggt 240
 acccccgccc ctgcccacca gagaacaacc ccctttgact gtaatttccc atcaccttcc 300
 caaatcctat aaaacggccc caccctatc tccctttgct 340

<210> 46
 <211> 394
 <212> DNA
 <213> Homo sapiens

<400> 46
 aaggcaggaa tgtcaggcct ctgagcccaa gccaaagccat cgcateccct gtgacttgca 60
 cgtatacacc cagatggcct gaagtaactg aagaatcaca aaagaagtga aaaggccctg 120
 cccgcctca actgatgaca ttccaccatg gtgatttgtt cctgccccac cttactgag 180
 tgattaaccc tgtgaatttc cttctcctgg ctcagaagct cccccactga gcaccttggt 240
 acccccgccc ctgcccacca gagaacaacc ccctttgact gtaatttccc atcaccttcc 300
 caaatcctat aaaacggccc caccctatc tccctttgct gactctctt ttggactcag 360
 cccgcctgca cccaggtgaa ataaacagcc atgt 394

<210> 47
 <211> 246
 <212> DNA
 <213> Homo sapiens

<400> 47
 tagccctgat aggcgctatt ttctcctgg ttttgtattt gaaccgcaag gggataaaaa 60
 agtggatgca taacatcaga gatgcctgca gggatcacat ggaagggtat cattacagat 120
 atgaaatcaa tgcggaccgg gggattaaca aacctcagtt ctaactcga tgtctgagaa 180
 atattagagg acagaccaag gacaactctg catgagatgt agacttaagc tttatcccta 240
 ctaggc 246

<210> 48
 <211> 336
 <212> DNA
 <213> Homo sapiens

<400> 48
 acatatattcc ttttcctcca ttggccacaa tgggctccaa acaaccacat gcagatttta 60
 caaaaagaaa gttccaaaac tgctcaatca aaagaaagat tcaactctgt gagatgaata 120
 cacacatcac aacgaagttt ctcagaatgc ttctgtgttg tttttatgtg aagatatttc 180
 cttttccatc ataggcctct aagtgcacat actatccact tgcagattct acaaaaagag 240
 tgtttcaaaa ctgctcaatc aaaagaaagt atcaactctg tgaggaaatg cacacatcac 300
 aaagaagttt ctcagaatga ttctgtgtag ttttta 336

<210> 49
 <211> 518
 <212> DNA
 <213> Homo sapiens

<400> 49
 cagaagggtc tgcaagatgc tgttcttggc cactttcttt cccacctggg aaggcgccat 60
 ctatgacttc attggggagt tcatgaaggc cagcgtggat gtgccagacc tgataggtct 120
 aaaccttggtc atgtcccggg atgccggcaa gggagagtac aagatcatgg ttgtgtccct 180
 gggctgggcc actgctgagc ttattatgtc ccgctgcatt cccctatggg tcggagcccc 240
 gggcattgag ttgactgga agtacatcca gatgagcata gactccaaca tcagtctggt 300
 ccattacatc gtcgctctg ctcaggctcg gatgataaca cgctatgac tgtaccacac 360
 cttccggcca gctgtcctcc tgctgatgtt cctcagtgtc tacaaggcct ttgttatgga 420
 gaccttcgtc cacctctgct cgctgggcag ttgggcagct ctactggccc gagcagtggg 480
 aacggggctg ctggccctca acactttggc cctgtatg 518

<210> 50
 <211> 326
 <212> DNA
 <213> Homo sapiens

<400> 50
 tctgcaagat gctgttcttg gccactttct tccccacctg ggaaggcggc atctatgact 60
 tcattgggga gttcatgaag gccagcgtgg atgtgccaga cctgataggt ctaaaccttg 120
 tcatgtcccg gaatgccggc aaggagagat acaagatcat ggttgctgcc ctgggctggg 180
 ccaactgctga gcttattatg tcccgtgca tccccctatg ggtcggagcc cggggcattg 240
 agtttgactg gaagtacatc cagatgagca tagactccaa catcagtctg gtccattaca 300
 tcgtcgcgtc tgctcaggtc tggatg 326

<210> 51
 <211> 331
 <212> DNA
 <213> Homo sapiens

<400> 51
 acattgaaaa aagtctagac aaactgaaag gcaataaatc ctatgtgaac atggacctct 60
 ctccggtggt agagtgcacg gaccacgctc taacaagtct cttccctaag actcattatg 120
 ccgctggaaa agatgccaaa attttctgga tacctctgtc tcacatgccg gcagctttgc 180
 aagacttttt attgttgaaa cagaaagcag agctggctaa tccaaggca gtgtgactca 240
 gctaaccaca aatgtctcct ccaggctatg aaattggccg atttcaagaa cacatctcct 300
 tttcaacccc attccttata tgctccaacc g 331

<210> 52
 <211> 253
 <212> DNA
 <213> Homo sapiens

<400> 52

```

acagaaggga tcgaagacaa attgaaggga gagatgatcg atctccaaca tggcagcctt 60
ttccttagaa caccaaagat tgtctctggc aaagactcta atgtaactgc aaactccaag 120
ctggtcatta tcacggctgg ggcacgtcag caagaggag aaagccgtct taatttggtc 180
cagcgtaacg tgaacatatt taaattcatc attcctaattg ttgtaaaata cagcccgaac 240
tgcaagttgc tta                                     253

```

<210> 53

<211> 356

<212> DNA

<213> Homo sapiens

<400> 53

```

atcgaagaca aattgaaggg agagatgatg gatctccaac atggcagcct tttccttaca 60
acaccaaaga ttgtctctgg caaagactat aatgtaactg caaactcca gctgggtcatt 120
atcacggctg gggcacgtca gcaagaggga gaaagccgtc ttaatttggt ccagcgtaac 180
gtgaacatat ttaaatccat cattcctaaa gttgtaaaat acagcccga ctgcaagttg 240
cttattgttt caaatccagt ggatatcttg acctacgtgg cttggaagat aagtggtttt 300
cccaaaaacc gtgttattgg aagagggtgc aatctggatt caacccgatt ccgcta 356

```

<210> 54

<211> 570

<212> DNA

<213> Homo sapiens

<400> 54

```

ccgctgccgc cgattccgga tctcattgcc acgcgcccc gacgaccgcc cgacgtgcat 60
tcccgaattcc ttttggttcc aagtccaata tggcaactct aaaggatcag ctgatttata 120
atcttctaaa ggaagaacag acccccaga ataagattac agttgttggg gttgggtgctg 180
ttggcatggc ctgtgccatc agtatcttaa tgaaggactt ggcagatgaa cttgctcttg 240
ttgatgtcat cgaagacaaa ttgaaggagg agatgatgga tctccaacat ggcagccttt 300
tccttagaac accaaagatt gtctctggca aagactataa tgtaactgca aactccaagc 360
tggtcattat cacggctggg gcacgtcagc aagagggaga aagccgtctt aatttggtcc 420
agcgtaacgt gaacatattt aaattcatca ttcctaattg tgtaaaatac agcccgaact 480
gcaagttgct tattgtttca aatccagtgg atatcttgac ctacgtggct tggaagataa 540
gtggttttcc caaaaaccgt gttattggaa 570

```

<210> 55

<211> 223

<212> DNA

<213> Homo sapiens

<400> 55

```

gccgtgccgc ccgattccgg atctcattgc cagcgcccc cgacgaccgc ccgacgtgca 60
ttcccgaattc cttttggttc caagtccaat atggcaactc taaaggatca gctgatttat 120
aatcttctaa aggaagaaca gacccccag aataagatta cagttgttgg ggttggtgct 180
gttggcatgg cctgtgccat cagtatctta atgaaggact tgg 223

```

<210> 56

<211> 337

<212> DNA

<213> Homo sapiens

<400> 56

```

gatgcccata agatatggga agctatgtta tcaagccata ttagatatca agcattaata 60
tggaataaaa ccagcctggt tgggtgggtc ttcacatgga cgcgcatgaa atttggtgcc 120
gtgactagga tcgggggacc tcccttggga gatcaatccc ctgtcctcct gctctttgct 180
ccgtgagaaa catgcaccta tggcctcatg ttctcaaacc gaccaaacca agaaacatct 240
caccaatttt aaatccgcct ggcttgtgag gccttttgac cccaattcaa gtcttttgat 300
accctgtgaa ttgcacccat actgcccgaa tggctag 337

```

<210> 57

<211> 473

<212> DNA

<213> Homo sapiens

<400> 57

```

aaagatcaaaa gtgctgggct cgggtgçggt cggcacgggtg tataagggac tctggatccc 60
agaagggtgag aaagttaaaa ttcccgtcgc tatcaaggaa ttaagagaag caacatctcc 120
gaaagccaac aaggaaatcc tcgatgaagc ctacgtgatg gccagcgtgg acaacccccca 180
cgtgtgccgc ctgctgggca tctgcctcac ctccaccgtg caactcatca cgcagctcat 240
gcccttcggc tgcctcctgg actatgtccg ggaacacaaa gacaatattg gctcccagta 300
cctgctcaac tgggtgtgtc agatcgcaaa gggcatgaac tacttggagg accgtcgctt 360
gggtgcaccgc gacctggcag ccaggaacgt actggtgaaa acaccgcagc atgtcaagat 420
cacagattttt gggctggcca aactgctggg tgcggaagag aaagaatacc atg 473

```

<210> 58

<211> 487

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> 7

<223> n = A,T,C or G

<400> 58

```

actatcnccc aggacatggg accatgctca gctgggttget atcaagacct tgaaagacta 60
taacaacccc cagcaatgga tggaaatttca acaagaagcc tccctaattg cagaactgca 120
ccaccccaat attgtctgcc ttctaggtgc cgtcactcag gaacâacctg tgtgcatgct 180
ttttgagtat attaatacagg gggatctcca tgagttcctc atcatgagat cccacactc 240
tgatgttggc tgcagcagtg atgaagatgg gactgtgaaa tccagcctgg accacggaga 300
ttttctgcac attgcaattc agattgcagc tggcatggaa tacctgtcta gtcacttctt 360
tgtccacaag gaccttgcca gctcgcaata ttttaatcgg agaggcaact ttcattgttaa 420
aggttttcag gacttggggg ctttccagag gaaattttac tccgctgatt tactacaggg 480
tacccaa 487

```

<210> 59

<211> 532

<212> DNA

<213> Homo sapiens

<400> 59

```

atagaagtct gggaaaaaaa taaaaacaga atttgagaac cttggaccac tctgtccct 60
gtagctcagt catcaaagca gaagtctggc tttgctctat taagattgga aatgtacact 120
accaaacact cagtccactg ttgagcccca gtgctggaag ggaggaaggc ctttcttctg 180
tgtaatttgc gtaaaggcta caggggttag cctggactaa aggcacctt gctttttgag 240
ctattcacct cagtagaaaa ggatctaagg gaagatcact gtagtttagt tctgttgacc 300
tgtgcaccta ccccttgga atgtctgctg gtatttctaa ttccacagg catcagatgc 360
ctgcttgata atatataaac aataaaaaa accttcactt cttcctattg taatcgtgtg 420
ccatggatct gatctgtacc atgaccctac ataaggctgg atggcaccac aggctgaggg 480
cccaatgta tgtgtggctg tgggtgtggg tgggagtgtg tctgctgagt aa 532

```

<210> 60

<211> 608

<212> DNA

<213> Homo sapiens

<400> 60

```

tacggccggg atagagtctg gaaaaaataa aaacagaatt tgagaacctt ggaccactcc 60
tgtccctgta gctcagtcac caaagcagaa gtctggcttt gctctattaa gattggaaat 120
gtacactacc aaacactcag tccactgttg agccccagtg ctggaaggga ggaaggcctt 180
tcttctgtgt taattgcgta gaggtacag gggtagcct ggactaaagg catccttgtc 240
ttttgagcta ttcacctcag tagaaaagga tctaaggga gatcactgta gtttagttct 300
gttgacctgt gcacctaccc cttggaaatg tctgtggta tttctaattc cacaggtcat 360

```

```

cagatgcctg cttgataata tataaacaat aaaaacaacc ttcacttctt cctattgtaa 420
tcgtgtgcca tggatctgat ctgtaccatg accctacata aggctggatg gcaccccagg 480
ctgagggccc caatgtatgt gtggctgtgg gtgtgggtgg gagtgtgtct gctgagtaag 540
gaacacgatt ttcaagattc taaagctcaa ttcaagtgc acattaatga taaactcaga 600
tctgatca 608

```

<210> 61

<211> 480

<212> DNA

<213> Homo sapiens

<400> 61

```

tagatgacac tgatgattct caccagtctt atgagtctca ccattctgat gaatctgatg 60
aactggtcac tgattttccc acggacctgc cagcaaccga agttttcact ccagttgtcc 120
ccacagtaga cacatatgat ggccgagggt atagtgtggt ttatggactg aggtcaaaat 180
ctaagaagtt tcgcagacct gacatccagt accctgatgc tacagacgag gacatcacct 240
cacacatgga aagcgaggag ttgaatgggt catacaaggc catccccgtt gccaggacc 300
tgaacgcgac ttctgattgg gacagccgtg ggaaggacag ttatgaaacg agtcagctgg 360
atgaccagag tgctgaaacc cacagccaca agcagtcacg attatataag cggaaagcca 420
atgatgagag caatgagcat tccgatgtga ttgatagtca ggaactttcc aaagtcagcc 480

```

<210> 62

<211> 440

<212> DNA

<213> Homo sapiens

<400> 62

```

aggagatccg gcagatgggc actgagtgcc attacttcat ctgtgatgtg ggcaaccggg 60
aggagggtga ccagacggcc aaggccgtcc gggagaaggt gggtgacatc accatcctgg 120
tgaacaatgc cgccgtgggt catgggaagg gcctaattgga cagtgatgat gatgccctcc 180
tcaagtccca acacatcaac accctgggcc agttctggac caccaaggcc ttcttgccgc 240
gtatgctgga gctgcagaat ggccacatcg tgtgcctcaa ctccgtgctg gcactgtctg 300
ccatccccgg tgccatcgac taccgcacat ccaaagcgtc agccttcgcc ttcatggaga 360
gcctgaccct ggggctgctg gactgtccgg gagtgcagcg caccacagtg ctgcccttcc 420
acaccagcac cgagatgttc 440

```

<210> 63

<211> 589

<212> DNA

<213> Homo sapiens

<400> 63

```

ggcactgagt gccattactt catctgtgat gtgggcaacc gggaggagggt gtaccagacg 60
gccaaaggccg tccgggagaa ggtgggtgac atcaccatcc tggggaacaa tgccgccgtg 120
gtccatggga agggcctaatt ggacagtgat gatgatgccc tcctcaagtc ccaacacatc 180
aacaccctgg gccagttctg gaccaccaag gccttcctgc cgcgtatgct ggagctgcag 240
aatggccaca tcgtgtgcct caactccgtg ctggcactgt ctgccatccc cggtgccatc 300
gactaccgca catccaaagc gtcagccttc gccttcattg agagcctgac cctggggctg 360
ctggactgtc cgggagtcag cgccaccaca gtgctgccct tccacaccag caccgagatg 420
ttccagggca tgagagtcag gtttcccaac ctctttcccc cactgaagcc ggagacgggtg 480
gcccggagga cagtggaagc tgtgcagctc aaccaggccc tcctcctcct cccatggaca 540
atgcatgccc tcgttatctt gaaaagcata ctccacagg ctgcactcg 589

```

<210> 64

<211> 313

<212> DNA

<213> Homo sapiens

<400> 64

```

gcatattgtg ctcggggaag ggttcttgtc attgtgggaa gtgcatttgt tctgctgaag 60
agtggatatat ttctggggag ttctgtgact gtgatgacag agactgcgac aaacatgatg 120

```

```

gtctcatttg tacaggaat ggaatatgta gctgtggaaa ctgtgaatgc tgggatggat 180
ggaatggaaa tgcattgtgaa atctggcttg gctcagaata tccttaacaa ttacatgaga 240
gaggtctgga ttcttatttt ttctgggcca ttagaacata taaatgcgaa ggaaaccatg 300
tatattcacc act 313

```

<210> 65
 <211> 223
 <212> DNA
 <213> Homo sapiens

```

<400> 65
tgtgaatcag cagatggcat attgtgctcg ggggaagggtt cttgtcattg tgggaagtgc 60
atattgttctg ctgaagagtg gtatatttct ggggagttct gtgactgtga tgacagagac 120
tgcgacaaac atgatggtct catttgtaca gggaaatggaa tatgtagctg tggaaactgt 180
gaatgctggg atggatggaa tggaaatgca tgtgaaatct ggc 223

```

<210> 66
 <211> 424
 <212> DNA
 <213> Homo sapiens

```

<400> 66
ggtacagatt tagagcctgt aatcccagct acttgggagt ctaaggcaag agaatccctt 60
gaacctggga ggtggagatt gcagtgaagt gagatcacac cattgcccta cagcctgggt 120
gacagtgaga ctgcccgaag aaaaaacaaa agagacagcc ctagtgatct tgtaagttgc 180
ctttggtggg tcagtccttc cttttcttaa agaatagtac acattgacag ccaggtagct 240
ctatgatcct gttctataga attcaaaaag tcgacaacct tcctttgttc ctttctgttt 300
tctctgccta cgtagttta aattggcagt gtctctgctg gaataatccc atctctcttc 360
ctggcttctg ctgagatggc tgattaaatc cttgggtcac acccattatc tctttatcaa 420
atgg 424

```

<210> 67
 <211> 487
 <212> DNA
 <213> Homo sapiens

```

<400> 67
ctgtaatccc agctacttgg gagtctaagg caagagaatc ccttgaacct gggaggtgga 60
gattgcagtg agctgagatc acaccattgc cctacagcct gggtgacagt gagactgccc 120
caagaaaaaa caaaagagac agccctagtg atcttghtaag ttgccttttg tgggtcagtc 180
tttccttttc ttaaagaata gtacacattg acagccaggt agctctatga tctgttcta 240
tagaattcaa aaagtcgaca accttccttt gttcctttct gttttctctg cctacgttag 300
tttaaattgg cagtgtctct gctggaataa tcccctctct cttcctggct tctgctgaga 360
tggtcgatta aatccttggg tcacacccat tatctcttta tcaaattggt gttcaggcta 420
ggctcagtg ttcacgcctg taatcccaac actttgggag actgaggagg gcagatcact 480
tgagctc 487

```

<210> 68
 <211> 492
 <212> DNA
 <213> Homo sapiens

```

<400> 68
agtgcgcac cgacgtcaa acgcgcgctc caaccgcgag cctcctcctg cctcaccgcc 60
cgaagatggc ggctctcaaa ctctctcct cggggttcg gctctgcgc tctgcccgcg 120
gatctggggc aacctggtac aagggatgtg tttgttcctt ttccaccagt gctcatcgcc 180
ataccaagtt ttatacagat ccagtagaag ctgtaaaaga catccctgat ggtgccacgg 240
ttttggttgg tggttttggg ctatgtggaa ttccagagaa tcttatagat gctttactga 300
aaactggagt aaaaggacta actgcagtca gcaacaatgc aggggttgac aattttggtt 360
tggggctttt gcttcggtcc aagcagataa aacgcagtgt ctcttcatat gtgggagaaa 420
atgcagaatt tgaacgacag tacttatctg gtgaattaga agtggagctg acaccacagg 480
gcacacttgc tg 492

```

<210> 69
 <211> 494
 <212> DNA
 <213> Homo sapiens

<400> 69
 tttttttttt tttttttttt tccctttata aggcgatgta cataaatctg aggaatatgg 60
 atgtcttctg gagcaaatgc tccaatatcc acaatttctt caacctctac cactgtgggt 120
 tctgcagctt tgcacattgg caagttgaaa ttccttgacac ttttcctgaa aatcacgttt 180
 cctgctcggg ccgccttcca ggctttcacc aaagcaaaat cccctgtaat tgcttcctcc 240
 aaaataaagt gctgaccatt gaactccctc acctctcttg gcttattggc aatggcaaca 300
 ctgccatctt tgttgatatt gatgggcat cctccttctt gtaccagggg cccataccct 360
 gttgggggtg aaaatgcagg aactccagcc ccgcctgcac ggatcctctc agcaagtgtg 420
 ccctgtgggtg tcagctccac ttctaattca ccagataagt actgtcgttc aaattctgca 480
 tttttctcca cata 494

<210> 70
 <211> 462
 <212> DNA
 <213> Homo sapiens

<400> 70.
 catgatgtat tacaaggagg ccttctggaa gaagaaggat tactgtggct gcatgatcat 60
 tgaagatgaa gatgctccaa tttcaataac ctgggatgac accaagccag atgggtcact 120
 gcctgccatc atgggcttta ttcttgcccg gaaagctggg cgacttgcta agctacataa 180
 ggaataaagg aagaagaaaa tctgtgagct ctatgccaaa gtgctgggat cccaagaagc 240
 ttacatcca gtgcattatg aagagaagaa ctgggtgtgag gagcagtact ctgggggctg 300
 ctacacggcc tacttccctc ctgggatcat gactcaatat ggaagggtga ttcgtcaacc 360
 cgtgggcagg attttctttg cgggcacaga gactgccaca aagtggagcg gctacatgga 420
 aggggcagtt gaggtctggg aacgagcagc tagggaggtc tt 462

<210> 71
 <211> 626
 <212> DNA
 <213> Homo sapiens

<400> 71
 catgatgtat tacaaggagg ccttctggaa gaagaaggat tactgtggct gctgatcatt 60
 gaaaatgaag atgctcaatt tcaataacct tggatgacac caagccagat gggtcactgc 120
 ctgccatcat gggcttcatt cttgcccggg aagctggctg acttgctaag ctacataagg 180
 aaataaggaa gaagaaaatc tgtgagctct atgccaaagt gctgggatcc caagaagctt 240
 tacatccagt gcattatgaa gagaagaagt ggtgtgagga gcagtactct gggggctgct 300
 acacggccta ctccctcctt gggatcatga ctcaatatgg aagggtgatt cgtcaaccgc 360
 tgggcaggat tttcttttgc ggcacagaga ctgccacaaa gtggagcggc tacatggaag 420
 gggcagttga ggctggagaa cgagcagcta gggaggtctt aaatggtctc ggggaaggtga 480
 ccgagaaaaga catctgggta caagaacctg aatcaaagga cgttccagcg gtagaaatca 540
 cccacacctt ctgggaaagg aacctgccct ctgtttctgg cctgctgaag atcattggat 600
 ttccacatca gtaactgccc tggggc 626

<210> 72
 <211> 348
 <212> DNA
 <213> Homo sapiens

<400> 72
 tggatgaactg gtcattccatg aaaaagggtt ttactacatc tattcccaaa catactttctg 60
 atttcaggag gaaataaaaag aaaacacaaa gaacgacaaa caaatgggtc aatatattta 120
 caaatacaca agttatcctg accctatatt gttgatgaaa agtgctagaa atagttgttg 180
 gtctaaagat gcagaatatg gactctattc catctatcaa gggggaatat ttgagcttaa 240
 ggaaaatgac agaatttttg tttctgtaac aaatgagcac ttgatagaca tggaccatga 300
 agccagtttt ttcggggcct ttttagttgg ctaactgacc tggaaaga 348

<210> 73
 <211> 207
 <212> DNA
 <213> Homo sapiens

<220>
 <221> misc_feature
 <222> 122, 123
 <223> n = A,T,C or G

<400> 73
 tcaactcagt ggaacacggt tctcccaaac agattttgta attccgaaaa ccacgcatgc 60
 gcaaacatac gcatacactc ccattgttct ggacagttta tagctaccat aacctggcat 120
 tnnccaaaac ataccatggt agactcttgg atacacaagg taattttaga gccacattag 180
 gatgaacctt ctgaaaaagt tatgcat 207

<210> 74
 <211> 497
 <212> DNA
 <213> Homo sapiens

<400> 74
 gagcttaagg aaaatgacag aatttttgtt tctgtaacaa atgagcactt gatagacatg 60
 gaccatgaag ccagtttttt cggggccttt ttagttggct aactgacctg gaaagaaaaa 120
 gcaataacct caaagtgact attcagtttt caggatgata cactatgaag atgtttcaaa 180
 aaatctgacc aaaacaaaca aacagaaaaac agaaaacaaa aaaacctcta tgcaatctga 240
 gtagagcagc cacaaccaa aaattctaca acacacactg ttctgaaagt gactcactta 300
 tccaagaaa atgaaattgc tgaaagatct ttcaggactc tacctcatat cagtttgcta 360
 gcagaaatct agaagactgt cagcttccaa acattaatgc aatgggttaac atcttctgtc 420
 ttataatct actccttcta aagactgtag aagaaagcgc aacaatccat ctctcaagta 480
 gtgtatcaca gtagtag 497

<210> 75
 <211> 275
 <212> DNA
 <213> Homo sapiens

<220>
 <221> misc_feature
 <222> 96
 <223> n = A,T,C or G

<400> 75
 tgagcttaag gaaaatgaca gaatttttgt ttctgtaaca aatgagcact tgatagacat 60
 ggaccatgaa gccagttttt tcggggcctt ttagntggc taactgaccc tggaaagaaa 120
 aagcaataac ctcaaagtga ctattcagtt ttcaggatga tacactatga agatgtttca 180
 aaaaatctga ccaaaacaaa caaacagaaa acagaaaaca aaaaacctc tatgcaatct 240
 gagtagagca gccacaacca aaaaattcta caaca 275

<210> 76
 <211> 530
 <212> DNA
 <213> Homo sapiens

<400> 76
 gacagaaggg gcctctccgc cccgcgtcca gctcgcccag ctcgcccagc gtccgccgcg 60
 cctcgcccaa ggcttcaacg gaccacacca aaatgccatc tcaaatggaa cacgccatgg 120
 aaacctgat gtttacattt cacaatttcg ctggggataa aggctactta acaaaggagg 180
 acctgagagt actcatggaa aaggagttcc ctggattttt ggaaaatcaa aaagaccctc 240
 tggtgtgga caaataatg aaggacctgg accagtgtag agatggcaaa gtgggcttcc 300
 agagcttctt ttcctaatt gcgggcctca ccattgcatg taatgactat ttgtagtac 360

acatgaagca gaagggaaag aagtaggcag aaatgagcag ttcgctcctc cttgataaga 420
gttgctccaa agggctcgctt aagggaatctg cccacacagct tcccccatag aaggatttca 480
tgagcagatc aggacactta gcaaatgtaa aaataaaatc taactctcat 530

<210> 77

<211> 341

<212> DNA

<213> Homo sapiens

<400> 77

gcctctccgc cccgcgtcca gctcgcccag ctgcccagc gtccgcccgc cctcggccaa 60
ggcttcaacg gaccacacca aaatgccatc tcaaattgaa cacgccatgg aaaccatgat 120
gtttacattt cacaaattcg ctggggataa aggctactta acaaaggagg acctgagagt 180
actcatggaa aaggagtcc ctggattttt ggaaaatcaa aaagaccctc tggctgtgga 240
caaaataatg aaggacctgg accagtgtag agatggcaaa gtgggcttcc agagcttctt 300
ttccctaatt gcgggcctca ccattgcatg taatgactat t 341

<210> 78

<211> 350

<212> DNA

<213> Homo sapiens

<400> 78

ggcctctccg cccgcgtgc agctcgccca gctcgcccag cgtccgcccgc gcctcggcca 60
aggcttcaac ggaccacacc aaaatgccat ctcaaattgga acacgccatg gaaaccatga 120
tgttacattt tcacaaattc gctggggata aaggctactt acaaaggagg gacctgagag 180
tactcatgga aaaggagtcc cctggatttt tggaaaatca aaaagaccct ctggctgtgg 240
acaaaataat gaaggacctg gaccagtgtg gagatggcaa agtgggcttc cagagcttct 300
tttcctaatt tgcgggcctc accattgcat gcaatgacta ttttgtagta 350

<210> 79

<211> 171

<212> DNA

<213> Homo sapiens

<400> 79

acagaaggga caaagagatc tggacagaat cgccggacag gtggcagctg ccaacaagaa 60
gcattagaac aaaccatgct ggggttaataa attgcctcat tcgtaaaca aaaaaaaaaa 120
aaaaaaaaaa agttttttt ttttcccccc attttttatt ttttttcccc c 171

<210> 80

<211> 389

<212> DNA

<213> Homo sapiens

<400> 80

tggcgctgtg ttctatggag gaaaacaaag caggagaggg gagagtgact gctgggtaag 60
gtcttctctc acctcctttg catctttgct cacatgccag ctctccttg gcttcacaga 120
ccaccaattt ataatttcca tttaaaactt ccattttatt tttttaattt ttattttatt 180
atatttttat tacgagatgg ggtttcgctc ttgttgccca agattgcacc actgcactgc 240
agcctgggtg acagagcgag actttgtcaa aaagaaagaa agaaagaagg aaaggaagga 300
aggaagggaag gaagggaagg aaagaaaaga aagggaagaa aaaaagaaaa agaaagaaag 360
aaagaaaaaa aaaaaaagg ggggcccc 389

<210> 81

<211> 430

<212> DNA

<213> Homo sapiens

<400> 81

tgcagataca gtggtggagt ggaagtttgc gttggtagag aatgggggag ttaccgctg 60
ggaagaatgc agcaatagat tcctagaaac tggccatgag gataaagtgg ttcacgcatg 120

```

gtgggggatt cactgattca gtttgcatag taatggagaa gctgtagaac aatgtggaag 180
aagctgaggt tgtggaacac actgaataaa ataaaggcag tgtgactcca aattcagcca 240
tctgaattgt ttaaatttgc tagtggattt tgtctactgt gcagaaatat atatgtctaa 300
tgtgcagaaa tatatatgtg tgtatgtgtg tatatatatg cacacacaca cagataatgc 360
ttccagtcaa tgtgaacttc ttttccctgt ggcactgatt gacagacttg tgcctgatcca 420
ttattacttt                                     430

```

<210> 82
 <211> 556
 <212> DNA
 <213> Homo sapiens

```

<400> 82
tttttttttt tttttttttt ttttttttaa gatattaaaa ttcaggtttt attatttggt 60
cagttataat aatttaagtt aatatttgct gtattctcag agcaaagatg tatttctgta 120
ccactgtcct gtataaattt gttaccacaag atagtactg gtatgaaagg agaggggaaga 180
gggtgacaga tggaaacgat tgctgtagga cagtccatct ggccagatgc ggtgggggag 240
gggagaagaa gtgggagaga gatggctcta cagatgctcc catgggtaaa tgatgggtgc 300
atccctccct gcagtcgggc tgtgcctgaa cttcacagtc ctctaagagg tgcattcag 360
gccacctcac tcagcctatg cccaaccca ctcactttcc ctttccttat gggctgcccc 420
cgcaactgac ttccatggtg attggttctc attaggccct ttgtttctac accagcctta 480
gatcattaag acaaagacgt acttgctacc ctcatagcac ataacaacgc ctggcagatg 540
aaaatcaaac aaaaag                                     556

```

<210> 83
 <211> 543
 <212> DNA
 <213> Homo sapiens

```

<400> 83
tgcagtgagc atgtcgggag ggaagggtcac agtccttgaa aagtcctgt atcaaaaggc 60
caactgaagc aatacttcta cgagaccaag tgcaatccca tgggttacac aaaagaaggc 120
tgcaggggca tagacaaaag gcatttgaac tcccagtgcc gaactacca gtcgtacgtg 180
cgggccctta ccatggatag caaaaagaga attggctggc gattcataag gatagacact 240
tcttgtgtat gtacattgac cattaaaagg ggaagatagt ggatttatgt tgtatagatt 300
agattatatt gagacaaaaa ttatctatct gtatatatac ataacagggt aaattattca 360
gttaagaaaa aaataatttt atgaactgca tgtataaatg aagtttatac agtacagtgg 420
ttctacaatc tatttatttg acatgtccat gaccagaagg gaaacagtca tttgcgcaca 480
acttaaaaag tctgcattac attccttgat aatgttgtgg tttgttgccg ttgccaagaa 540
ctg                                     543

```

<210> 84
 <211> 242
 <212> DNA
 <213> Homo sapiens

```

<400> 84
cggcggcaga caaaaagact gcagtgagca tgtcgggagg gacggtcaca gtccttgaaa 60
agggtccctgt atcaaaaggc caactgaagc aatacttcta cgagaccaag tgcaatccca 120
tgggttacac aaaagaaggc tgcaggggca tagacaaaag gcatttgaac tcccagtgcc 180
gaactacca gtcgtacgtg cgggccctta ccatggatag caaaaagaga attggctggc 240
ga                                     242

```

<210> 85
 <211> 350
 <212> DNA
 <213> Homo sapiens

```

<400> 85
tttttttttt tttttttttt tttttttttt tttttttttt tttattatta attatcttct 60
ttattaatac tcacatgtaa cctttgcttt ttacacaaaa gtctgcttta gaagaatgcc 120
tcctcgggctt atcatgccca atggggcttt ttgtttctgg accacttccc ctttctccac 180

```

```

ccccaccccc acatccaaat tactcttaac atgttcacag ataccacgaa tattttgtaa 240
acaagatttg ggttactgga acttgatttc attaacatcc cacttcaaaa tggaaggcag 300
gtggaggaca gggtaagaaa taggagaaa aggacaagag aaggcaaaga 350

```

<210> 86

<211> 448

<212> DNA

<213> Homo sapiens

<400> 86

```

acagttaaag aagtgggtgac attttgcatg atgaatgacc tgacttttag ccaccaggta 60
ctctttaaac agttttcctt atcagaggcc ctctgtgct ggtgaccag catctgagtt 120
aggttccagc atgtaaagag ctgggagggc ggagaattct tagcatacat tcagacgttt 180
tttctgcaca ataataagtc catctgtcac ttgcattcca ctttttgta catagaaaga 240
gtctgaccct ttaatccaaa aggtcttttt acattgtgaa tgctgtggga aggcaatttc 300
tctgcacaca agaggctacg ttttggaagt gatgtatgtt atttgatgac tgaaaatgaa 360
ctgtaaagtc tcctagagta tattcctctg ctgaacaaaa ttaaaactta aaaaaatcta 420
acagtaacac acccctgctt gggaccct 448

```

<210> 87

<211> 586

<212> DNA

<213> Homo sapiens

<400> 87

```

aatttacaga acagttaaag aagtgggtgac attttgcatg atgaatgacc tgacttttag 60
ccaccaggta ctctttaaac agttttcctt atcagaggcc ctctgtgct ggtgaccag 120
catctgagtt aggttccagc atgtaaagag ctgggagggc ggagaattct tagcatacat 180
tcagacgttt tttctgcaca ataataagtc catctgtcac ttgcattcca ctttttgta 240
catagaaaga gtctgaccct ttaatccaaa aggtcttttt acattgtgaa tgctgtggga 300
aggcaatttc tctgcacaca agaggctacg ttttggaagt gatgtatgtt atttgatgac 360
tgaaaatgaa ctgtaaagtc tcctagagta tattcctctg ctgaacaaaa ttaaaactta 420
aaaaaatcta acagtaacac acccctgctt gggaccctag ctatatgcat tttatgtgac 480
cttgccatgc ttcagtgaac atactaatc tatgtctagc acatgttgat ttcctatgta 540
ttctgggtat tctattaaag gaaactttga actatgtcaa aaaaaa 586

```

<210> 88

<211> 203

<212> DNA

<213> Homo sapiens

<400> 88

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aatgaattta cagaacagtt taagaagtgg tgacattttg catgatgaat gacctgactt 60
ttagccacca ggtactcttt aaacagtttt ccttatcaga ggccctcctg tgctgggtgac 120
ccagcatctg agtttaggttc cagcatgtaa agagctggga gggcggagaa ttcttagcat 180
acattcagac gttttttctg cac 203

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<210> 89

<211> 548

<212> DNA

<213> Homo sapiens

<400> 89

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tgctggaagg cattcgcacg tgccggcgag ggcttcgcga accggatcgt cttccaggag 60
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aagcaggcct gcattctcat gatcaaagcc ctggaacttg accccaactt atacaggata 180
gggcagagca aaatcttctt ccgaactggc gtccctggcc acctagagga ggagcgagat 240
ttgaagatca ccgatgtcat catggccttc caggcgatgt gtcgtggcta cttggccaga 300
aaggcttttg ccaagaggca gcagcagctg accgccatga aggtgattca gaggaactgc 360
gctgcctacc tcaagctgcg gaactggcag tgggtggaggc ttttcaccaa agtgaagcca 420
ctgctgcagg tgacacggca ggaggaggag atgcaagcca aggaggatga actgcagaag 480
accaaggagc ggcagcagaa ggcagagaat gagcttaagg agctggaaca gaagcactcg 540

```

cagctgac

548

<210> 90

<211> 595

<212> DNA

<213> Homo sapiens

<400> 90

tgcaatgggg	tgctggaagg	cattcgcac	tgccggcagg	gcttcccca	ccggatcgtc	60
ttccaggagt	tccgccaacg	ctacgagatc	ctggcggcga	atgccatccc	caaaggcttc	120
atggacggga	agcaggcctg	cattctcatg	atcaaagccc	tggaacttga	ccccaaactta	180
tacaggatag	ggcagagcaa	aattcttctt	cgaactggcg	tcctggccca	cctagaggag	240
gagcgagatt	tgaagatcac	cgatgtcatc	atggccttcc	aggcgatgtg	tcgtggctac	300
ttggccagaa	aggcttttgc	caagaggcag	cagcagctga	ccgccatgaa	ggtgattcag	360
aggaactgcg	ctgcctacct	caagctgctg	aactggcagt	ggtggaggct	tttcaccaa	420
gtgaagccac	tgctgcaggt	gacacggcag	gaggaggaga	tgaggccaa	ggaggatgaa	480
ctgcagaaga	ccaaggagcg	gcagcagaag	gcagagaatg	agcttaagga	gctggaacag	540
aagcactcgc	agctgaccga	ggagaagaac	ctgctacagg	aacagctgca	ggcag	595

<210> 91

<211> 498

<212> DNA

<213> Homo sapiens

<400> 91

tgacagagca	agacttggtt	tcaaaaaaga	gaaacacagt	tgccctcca	tatctgagtt	60
tcacagacga	aaaatattca	gaagaaaaaa	aatcaatgg	ctgtatttgt	actaaacatg	120
cccaggcttt	ttttcttatt	gttatccct	aaacaataca	acaactat	ttatagcatt	180
tacattgtat	tagatgttat	aactactcta	aagaggattt	aaagtatatg	gaatgatgtg	240
cataggttat	atgcaaatac	tatactat	atatcaggga	cttgagcatc	cttgatttt	300
ggtatgtgtg	ggaggtcctg	aaaccaatgt	cctgtggata	ctgaaggata	actgtactaa	360
tttgagatt	tctctctact	atgatcaaga	ttttcaaaca	ttacattgct	gattacatta	420
catcgttaca	ttgtgattct	ttccaagact	tgagataaag	tttggaaga	agtaccactt	480
gtttcagttt	atgaaata					498

<210> 92

<211> 510

<212> DNA

<213> Homo sapiens

<400> 92

aaacacagtt	ggccctccat	atctgagttt	cacagacgaa	aatatttcag	aagaaaaaaa	60
aatcaatggc	tgtatttgta	ctaaacatgc	ccaggctttt	tttcttattg	ttatccccta	120
aacaatacaa	caactat	tatagcattt	acattgtatt	agatgttata	actactctaa	180
agaggattta	aagtatatgg	aatgatgtgc	atagggtata	tgcaataact	atactattta	240
tatcaggggac	ttgagcatcc	ttggattttg	gtatgtgtgg	gaggctcctga	aaccaatgtc	300
ctgtggatac	tgaaggataa	ctgtactaat	ttggagattt	ctctctacta	tgatcaagat	360
tttcaaacat	tacattgctg	attacattac	atcgttacat	tgtgattctt	tccaagactt	420
gagataaagt	ttgggaagaa	gttaccactt	gtttcagttt	atgaaataga	aaaaaaaaaa	480
aggggtaaag	catgaaataa	aaacctaacc				510

<210> 93

<211> 299

<212> DNA

<213> Homo sapiens

<400> 93

tgatcccc	gggtgcagg	aattcggcac	gagcagaagt	gcctgagacg	cggagacatg	60
gctggtgtta	aatggagcta	ttcaatagca	gtgacgcgct	ctcctcagcc	accaaagtgc	120
cctgacaccc	tccccagccc	ccacagataa	catcagctga	ggtttttttc	agtatgaacc	180
tgctcctaat	caattcctca	aagtgtgcac	aaaactaaag	aataataaata	aacaaaagaa	240
aggtgaaaaa	aaaaaaaaaa	aaaaaaactc	gggggggggc	ccggggcccca	attccccct	299

<210> 94
 <211> 234
 <212> DNA
 <213> Homo sapiens

<220>
 <221> misc_feature
 <222> 163, 189, 219, 222, 225, 226, 228, 233
 <223> n = A,T,C or G

<400> 94
 cagaagtgcc tgagacgcgg agacatggct ggtgttaaat ggagctattc aatagcagtg 60
 acgcgctctc ctccagccacc aaatgtccct gacaccctcc ccagcccca cagataacat 120
 cagctgaggt ttttttcagt atgaacctgt cctaaatcaa ttntctaaaag tgtgcacaaa 180
 actaaagant ataaataaac aaaagaaagg tgaaaaaana anaannanaa aana 234

<210> 95
 <211> 534
 <212> DNA
 <213> Homo sapiens

<400> 95
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 tcttctgggg cctgcgctct tactatgaga ccagcaagat gaaagtccct aagtttgctt 120
 gcaaggtaca aaagaaggat cccaaggaat gggcagctca gtaccgagag gcgatggaag 180
 cagatttgag ggctgcagct gaggtgcag ctgaagccaa ggctagggcc gagattagag 240
 ctgcaatggg cattgggctc ggctcggaga atgctgccgg gccctgcaac tgggacgaag 300
 ctgatatcgg accctgggccc aaagcccga tccaggcggg agcagaagct aaagccaaag 360
 cccaagagag tggcagtgcc agcactgggt ccagtaccag taccaataac agtgccagtg 420
 ccagtgccag caccagtggg ggcttcagt ctggtgccag cctgaccgcc actctcacat 480
 ttgggctctt cgctggcctt ggtggagctg gtgccagcac cagtggcagc tctg 534

<210> 96
 <211> 351
 <212> DNA
 <213> Homo sapiens

<400> 96
 tttttttttt tttttttttt tttctgaaat ggcaaataga tttaatgcag agtgtcaact 60
 tcaattgatt gatagtggct gcctagagtg ctgtgttgag taggtttctg aggatgcacc 120
 ctggcttgaa gagaaagact ggcaggatta acaatatcta aaatctcact tgtaggagaa 180
 accacaggca ccagagctgc cactgggtgc ggcaccagct ccaccaaggc cagcgaagag 240
 cccaaatgtg agagtggcgg tcaggctggc accagcactg aagccaccac tgggtgctggc 300
 actggcactg gcactgttat tggtagtggg actggcacca gtgctggcac t 351

<210> 97
 <211> 610
 <212> DNA
 <213> Homo sapiens

<400> 97
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 gctgaacttc tgcaaaagat agaagtaccc ctttattcac tgttggaaca aactcatctc 120
 aaagtagaag atgtgagtgc agttgagatt gttggaggca ctacacgaat tccagctgtg 180
 aaggaaagaa ttgccaaatt ctttggaata gatattagca caacactcaa tgcagatgaa 240
 gcagtagcca gaggatgtgc attacagtgt gcaatacttt ccccgccatt taaagttaga 300
 gaattttccg tcacagatgc agttcctttt ccaatatctc tgatctggaa ccatgattca 360
 gaagatactg aaggtgttca tgaagtcttt agtcgaaacc atgctgctcc tttctccaaa 420
 gttctcacct ttctgagaag ggggcctttt gcctagaag ctttctatc tgatcccaaa 480
 ggagttccat atccagaagc aaaaataggc cgctttgtag ttcagaatgt ttctgcacag 540
 aaagatggag aaaaatctag agtaaaagtc aaagtgcgag tcaacaccca tggcattttc 600

accatctcta

610

<210> 98

<211> 551

<212> DNA

<213> Homo sapiens

<400> 98

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tttttttttt tttttttttt tagcattatc atctttaccct ctgtctcaat atacatgtta 60
agaagggtctt tccctaactg ccagaccaag ttggcttcaa taggcagctc aacattcacc 120
accttttattt tgggcttttt agctttctgga ggctgggtcaa cttttttttc atttgctttg 180
tcagcatctg ggattttgtt ttctttctgag gtaagttcag gtgaaggggg agactgtgag 240
gtttgttgag catcagtttg tacctggggc tgtgttccag cttcactgtt gtcttgctgg 300
acatttttat cagtgtctgg gttttctggg ggtctctgat tcagacactc catgtcagct 360
tcagaagaca tttcattctc ctcagttggg actttctcca ccatagatgc cgtagagatg 420
gtgaaaatgc catgggtgtt gactcgcact ttgactttta ctctagattt ttctccatct 480
ttctgtgcag aaacattctg aactacaaag cggcctattt ttgcttctgg atatggaact 540
ccttggggat c                                     551

```

<210> 99

<211> 550

<212> DNA

<213> Homo sapiens

<400> 99

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tgtggggctc tatttttgc tttggctttct ggtgagagag tgaggaagca ttctttcctt 60
cactaagttt gtctttcttg tcttctggat agattgattt taagagacta agggaattta 120
caaactaaaag atttttagtca tctgggtgga aaggagactt taagattgtt tagggctggg 180
cggggtgact cacatctgta atcccagcac tttgggaggc caaggcaggc agaacacttg 240
aaggagttcg agaccagcgt ggccaacgtg gtgaaacctt gtcttacta aaaatacaaa 300
aattgttttag ctctgttttt cataatagaa atagaaaagg taaaattgct tttcttctga 360
aaagaacaag tattgttcat ccaagaaggg tttttgtgac tgaatcagca gtgcctgccc 420
tagtcatagc tgtgcttcaa aaacctcagc atgattagtg ttggagcaaa acaaggaagc 480
aaagcaaata ctgtttttga aattctatct gttgcttgaa ctattttgta ataattaaac 540
tttgatgttg                                     550

```

<210> 100

<211> 300

<212> DNA

<213> Homo sapiens

<400> 100

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ctaagcttta agatttaaaa aatgttcaat gttgaaattt ctgtggggct ctatttttgc 60
tttggctttc tgggtgagaga gtgaggaagc attctttcct tcactaagtt tgtctttcct 120
gtcttctgga tagattgatt ttaagagact aagggaattt acaaaactaaa gatttttagtc 180
atctgggtgga aaaggagact ttaagattgt ttagggctgg gcgggggtgac tcacatctgt 240
aatcccagca ctttggggagg ccaaggcagg cagaacactt gaaggagttc aagaccagcg 300

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<210> 101

<211> 583

<212> DNA

<213> Homo sapiens

<400> 101

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gtttgagtca tgagcatgct gttgtctaga gtgggcgggg atgacgtggg tggagtgggt 60
gcgctgctct gtacttgatt tttttgagtc tgaaattagc tttccaggct ggggcaggga 120
ggggagcaca ggtggatcag tactgcccc aagcgggtgga gctttgggtg tggatcaaatt 180
actgctgccg cctgtctgca caaacatatt tctctcttcc agcccttcag aagtgtattg 240
gaatatgtcg ataacaataa tgatgggtgg gaagatgatg atgatgtggg taattctggc 300
taccttattg ggtccaagct cccacacaatt cgttgcacaa agcactctac atacattctc 360
tttagtcctg atcaaaccac ctttcagagt aggtatttagt gtcctatttt aaagatgaag 420

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gagctcgggc tcagagagag atcgtttaga cacacacaca actttggaat gaaacattta 480
 cagccgggcg cgggtggcgc tgctgtagt cccagctact tgggaggctg aggctggagg 540
 atcgcttgag tccaggagtt ctgggctgta gtgcgctatg ccg 583

<210> 102

<211> 517

<212> DNA

<213> Homo sapiens

<400> 102

cccgggaaggc gacgggaagg agccgagctt ggggtcatggc ggcgccgggc gcgctgctgg 60
 tgatgggctg gagcggtctg gggaaatcca ccgtgggctg cctgctggca tctgagctgg 120
 gatggaaatt ctatgatgct gatgattatc acccgaggga aaatcgaagg aagatgggaa 180
 aaggcatacc gctcaatgac caggaccgga ttccatggct ctgtaacttg catgacattt 240
 tactaagaga tgtagcctcg ggacagcgtg tggttctagc ctgttcagcc ctgaagaaaa 300
 cgtacagaga catattaaca caaggaaaag atggtgtagc tctgaagtgt gaggagtcgg 360
 gaaaggaagc aaagcaggct gagatgcagc tccgtgtgtt ccatctgagc gggtcgtttg 420
 aggtcatctc tggacgctta ctcaaaagag agggacattt tatgccccct gaattattgc 480
 agtcccagtt tgagactctg gagccccag cagctcc 517

<210> 103

<211> 590

<212> DNA

<213> Homo sapiens

<400> 103

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 gcatgagcaa gaatgttcta aacaatgtaa cgattttccag cattgattac agaatttcct 120
 ctgatcattt gatttgggta tagatgaatt taaacttcaa tttaagcttg acttttaaaa 180
 ctccccctct gcttctctgat gaaccagcat aattcctaaa attacaccta aacaagtctg 240
 tcttgacaca ttgggggttg ccttttagaaa catttagaat ctattatggg caaggcggct 300
 ggaacgaggt ttgggatggc acaatgattt atgcttagtt ctgtttggac cactgataca 360
 aaatcattgt catttcattt ttaggggtttc cataattgta gcaattatct ctgaaacatt 420
 tttgtccaca cttatttgga taaagttttc tggagctgct gggggctcca gagtctcaaa 480
 ctgggactgc aataattcag ggggcataaa atgtccctct cttttgagta agcgtccaga 540
 gatgacctca aacgaaccgc tcagatggac caccaggagc tgcattctcag 590

<210> 104

<211> 116

<212> DNA

<213> Homo sapiens

<400> 104

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 ttccactgct ggggattggg gtgtggggagc acgcttacta ccttcagtat aaaaat 116

<210> 105

<211> 574

<212> DNA

<213> Homo sapiens

<400> 105

ttcttttttt tttttttttt ttgtcacaaa gcatttacta ttttcaatca cttgcccaat 60
 aacaaaatgt ttagtaagaa attattcaga acattaagtt gtttatgaaa taagtgacta 120
 agcaacatca agaaatgcta caatagagca gcttactgta ttctgcagta ctctatacca 180
 ctacaaaaac agtcataaag agcttaacat actcagcata acgatcgtgg tctacttttt 240
 gcaagccatg tatctttcag ttacattctc ccagttgatt acattccaaa tagcttttag 300
 ataactcaggc ctgacatttt tatactgaag gtagtaagcg tgctcccaca caccaatccc 360
 cagcagtggg ataaggcctg ttgttccttg cagtggatcc tgatttggac aagcagcaat 420
 ttgtaagtgt ccccgcttct tattgaaacc aagccaaccc caacctgagc cttggacacc 480
 aacagatgca gccgtcagct tctccttaaa cttgtcaaaag gaaccaaaagt cacgtttgat 540
 ggcttccagc aactcccctt tgggttctcc acca 574

<210> 106
 <211> 474
 <212> DNA
 <213> Homo sapiens

<400> 106
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 tcacacaatt ggaaaataaa tgtttcttca atgaataatc aaacaaaaat tatccaggac 120
 cttatagggt tttcagtatg taccaggctt gatgcacatc ttagaagaca ggacattatc 180
 ttgctgggat cattagggtg tgatcagcat aacgatcgtg gtttactttt tgcaagccat 240
 gtatctttca gttacattct cccagttgat tacattccaa atagctttta gataatcagg 300
 cctgacattt ttatactgaa ggtagtaagc gtgctccac acatcaatcc ccagcagtg 360
 aataaggcct gttgttcctt gcagtggatc ctgatttggg caagcagcaa tttgtaagt 420
 tccccgttcc ttattgaaac caagccaacc ccaacctgag ccttggacac caac 474

<210> 107
 <211> 526
 <212> DNA
 <213> Homo sapiens

<400> 107
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 cgaacaccaa agtccgggaa cttaagcatt ttcggtttct agggttgtta cgaagctgca 120
 ggagcgagat ggaggtggac gcaccgggtg ttgatggtcg agatggcttc cgggagcggc 180
 gaggcttttag cgagggaggg aggcagaact tcgatgtgag gcctcagttc ggggcaaatg 240
 ggcttcccaa acactcctac tggttggacc tctggtttt catccttttc gatgtggtgg 300
 tgtttctctt tgtgtatttt ttgccatgac ttgttcgctg atatctaaat taagaagttg 360
 gttcttgagt gaattctgaa aatggctaca aacttcttga ataaagaaga caggactctc 420
 aatagaagaa tttcacatct ccaagggacc cttcctttca ttttacactt tgttactaat 480
 ttgcagaact ctattaattg ggtaggattt caccatttcc tagcta 526

<210> 108
 <211> 344
 <212> DNA
 <213> Homo sapiens

<400> 108
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 aacaccaaag tccgggaact taagcatttt cggtttctag gggtgttacg aagctgcagg 120
 agcgagatgg aggtggacgc accgggtgtt gatggtcgag atggtctccg ggagcggcga 180
 ggcttttagcg agggagggag gcagaacttc gatgtgaggc ctcagtctgg ggcaaatggg 240
 cttcccaaac actcctactg gttggacctc tggcttttca tccttttcga tgggggggag 300
 cttctctctg tgtattttct gccatgacct gttcagtgac accc 344

<210> 109
 <211> 332
 <212> DNA
 <213> Homo sapiens

<400> 109
 gaaccggggg cgcggcgcac tgcgcaggcg gccggactcc gctcagtttc cgggtgcggcg 60
 aacaccaaag tccgggaact taagcatttt cggtttctag gggtgttacg aagctgcagg 120
 agcgagatgg aggtggacgc accgggtgtt gatggtcgag atggtctccg ggagcggcga 180
 ggcttttagcg agggagggag gcagaacttc gatgtgaggc ctcagtctgg ggcaaatggg 240
 cttcccaaac actcctactg gttggacctc tggcttttca tccttttcga tgtggaggag 300
 attctctttg tgtatttttt gccatgacct gt 332

<210> 110
 <211> 545
 <212> DNA
 <213> Homo sapiens

<400> 110

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cggctgcgag aagacgacag aaggggagtt tccggtgctg cgaacaccaa agtccgggaa 60
cttaagcatt ttcggtttct aggggtgtta cgaagctgca ggagcgagat ggaggtggac 120
gcaccgggtg ttgatggtcg agatggtctc cgggagcggc gaggttttag cgaggaggag 180
aggcagaact tcgatgtgag gcctcagtct ggggcaaatg ggcttcccaa acactcctac 240
tggttgagacc tctggctttt catccttttc gatgtggtgg tgtttctctt tgtgtatttt 300
ttgccatgac ttgttcgctg atatctaaat taagaagttg gttcttgagt gaattctgaa 360
aatggctaca aacttcttga ataaagaaga caggactctc aatagaagaa tttcacatct 420
ccaagggacc cttcctttca ttttacactt tggtactaat ttgcagaact ctattaattg 480
ggtaggattt caccatttcc tagctaagtt cttaaaatta aaccctttgg ttcgtgttta 540
aaaac 545

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<210> 111

<211> 329

<212> DNA

<213> Homo sapiens

<400> 111

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gagtttccgg tgcggcgaac accaaaagtcc gggaacttaa gcattttcgg tttctagggt 60
tgttacgaag ctgcaggagc gagatggagg tggacgcacc ggggtgttgat ggtcgagatg 120
gtctccggga gcggcgaggc tttagcgagg gagggaggca gaacttcgat gtgaggcctc 180
agtctggggc aaatgggctt cccaaacact cctactggtt ggacctctgg cttttcatcc 240
ttttcgatga ggagggtgtt ctctttgtgt attttttgcc atgacttggt cgctgatatc 300
taaatttaca agttggatct tgagtgaag 329

```

<210> 112

<211> 284

<212> DNA

<213> Homo sapiens

<400> 112

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gcgcggcgcc tcgcctcggc cggcgccctat cagccgactt agaactggtg cggaccaggg 60
gaatccgact gtttaattaa aacaaagcat cgcgaaggcc gcgcggcggg gttgacgcga 120
tgtgatttct gccagtgct ctgaatgcca tattaataat aaactttaaa atttaaaagg 180
gggcccgttt tctctgattc ccaccccggt aaaaaccctt ttgggggggg ggcccccccc 240
ccctcatggg gcgggggaaa aaggcctttt ttgggaaatt tggg 284

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<210> 113

<211> 522

<212> DNA

<213> Homo sapiens

<400> 113

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gttgacagtc actgtagcgg gacttctttt ggttttcttt ctctttgggg cacctctgga 60
ctcactcccc agcatgaagg cgctgagccc ggtgcgcggc tgctacgagg cgggtgtgctg 120
cctgtcggaa cgcagtctgg ccctgcggcg gggccgaggg aaggggcccg cagctgagga 180
gccgctgagc ttgctggacg acatgaacca ctgctactcc cgcctgcggg aactggtacc 240
cggagtcccg agaggcactc agcttagcca ggtggaaatc ctacagcgcg tcatcgacta 300
cattctcgac ctgcaggtag tctggccga gccagccctt ggacccctg atggcccca 360
ccttcccatc cagacagccg agcccgtctc ggaacttgct atctccaacg aaaaaggag 420
cttttgccac tgactccggc cgtgtcctga cacctccaga acgcaggtgc tggcgcccgt 480
tctgcctggg accccgggaa cctctcctgc cggaagccgg ac 522

```

<210> 114

<211> 510

<212> DNA

<213> Homo sapiens

<400> 114

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gttgacagtc actgtagcgg gacttctttt ggttttcttt ctctttgggg cacctctgga 60
ctcactcccc agcatgaagg cgctgagccc ggtgcgcggc tgctacgagg cgggtgtgctg 120

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cctgtcggaa cgcagtctgg ccacgcgccg gggccgaggg aagggcccg cagctgagga 180
gccgctgagc ttgctggacg acatgaacca ctgctactcc cgcctgcggg aactggtacc 240
cggagtcgcc agaggcactc agcttagcca ggtggaaatc ctacagcgcg tcatcgacta 300
cattctcgac ctgcaggtag tcttgccga gccagccctt ggacccctt atggcccca 360
ccttcccatc cagacagccg agcccgctcc ggaacttgct atctccaacg aaaaaaggag 420
cttttgccac tgactcggcc gtgtcctgac acctccagaa cgcaggtgct ggcgcccgtt 480
ctgcctggga ccccggaac ctctcctgcc
510

```

<210> 115

<211> 385

<212> DNA

<213> Homo sapiens

<400> 115

```

aatagtctgt gtccaagaaa ataagaatca cgtcatctag ctgtggacac tgagcaaaaa 60
ggagcagcat gctattaaga tggttgagac acacgagtga acaaagatgg gacaaactgt 120
gcttcgttca agaagtttca tcaagacccc taccgcccc cgtccttcag ctctgtacag 180
taacttttagc ttacataga gctgagataa aaataaagct ttcttataaa ttacattttt 240
ttccagtga tttacttttg agtaaaaaata gctgctacat aaatccctcc tgatctctga 300
aaaggagttg catatttcca aaaataatat tcttatttta atcacacaga agaacgtgga 360
gcacaggaag gaaatggctg gctgg
385

```

<210> 116

<211> 645

<212> DNA

<213> Homo sapiens

<400> 116

```

tacggccggg tcttttaaag aggccgggaa tacacatgac tcaggtgctc ttttgaaacg 60
actacaaaag tctccatttt gatcaaaacg ttttctccga atgaatggct ccgatgcttt 120
ctctttccca tcttaagtcc ccgctctgtg cctcagaata gtctgtgtcc aagaaaataa 180
gaatcacgtc atctagctgt ggacactgag caaaaaggag cagcatgcta ttaagatggg 240
tgagcacacac gagtgaacaa agatgggaca aactgtgctt cgttcaagag gtttcatcaa 300
gacccctacc gcccccgtc cttcagctct gtacagtaac tttagcttta catagagctg 360
agataaaaat aaagctttct tacaatttac atttttttcc agtgaattac ttttgacgta 420
aaaatagctg ctacataaat cctcctgat ctctgaaaag gaggttgcata tttccaaaaa 480
taatatctt attttaatca cacagaagaa cgtggagcac aggaaggaaa tggctggctg 540
gtcagggaga ggtgagctgt cggagaaaca cagtaaaact aaaaaataaa atccattttg 600
tgtataaact gacttaaacg catgcaaaga agtggaaaac atatg
645

```

<210> 117

<211> 500

<212> DNA

<213> Homo sapiens

<400> 117

```

atgtcgaggg aatgcagaaa gagttaagga aggcaggttg tccttctatt caggccactc 60
ttcgttttcc atgtactgca tgctgtttgt ggcactttat cttcaagcca ggatgaaggg 120
agactgggca agactcttac gccccacact gcaatttggg cttgttgccg tatccattta 180
tgtgggcctt tctcgagttt ctgattataa acaccactgg agcgatgtgt tgactggact 240
cattcagggg gctctgggtg caatattagt tgcgttatat gtatcggatt tcttcaaaga 300
aagaacttct tttaaagaaa gaaaagagga ggactctcat acaactctgc atgaaacacc 360
aacaactggg aatcactatc cgagcaatca ccagccttga aaggcagcag ggtgccagg 420
tgaggctggc ctgttttcta aaggaagatg attgccacaa ggcaagaaga tgcattttt 480
ttcctggtgt acaagccttt
500

```

<210> 118

<211> 592

<212> DNA

<213> Homo sapiens

<400> 118

```

taaggaaggc aggttgtcct tctattcagg ccactcttcg ttttccatgt actgcatgct 60
gtttgtggca ctttatcttc aagccaggat gaagggagac tgggcaagac tcttacgccc 120
cacactgcaa tttgggtctt ttgccgtatc ctttatgtg ggcctttctc gagtttctga 180
ttataaacac cactggagcg atgtgttgac tggactcatt cagggagctc tggttgcaat 240
attagttgct gtatatgtat cggatttctt caaagaaaga acttctttta aagaaagaaa 300
agaggaggac tctcatacaa ctctgcata aacaccaaca actgggaatc actatccgag 360
caatcaccag ccttgaaagg cagcaggggtg ccaggtgag gctggcctgt tttctaaagg 420
aagatgattg ccacaaggca agaggatgca tctttcttcc tgggtgtacaa gcctttaaag 480
acttctgctg ctgctatgcc tcttgatgc acactttgtg tgtacatagt tacctttaac 540
tcagtgggta tctaatagct ctaaaactcat taaaaaaact ccaagccttc ca 592

```

<210> 119

<211> 197

<212> DNA

<213> Homo sapiens

<400> 119

```

ggccgccctt tttttttttt tttttttttt ttttttttgg ggaaaagggg gtcttttttg 60
gggtcccccc ccccttttaa aaaaccccc taaaaaatgc ccccaaaaaa aaaaattttt 120
ttttttgggg ggggggaaaa aaagggggaa aaaaccccc cccccgggg ggggaaaaaa 180
acccccccaa aaccccc 197

```

<210> 120

<211> 493

<212> DNA

<213> Homo sapiens

<400> 120

```

tttttttttt ttaatggtaa aaactttatt tactatttat aaatacattg caagacaaac 60
ttctcaaaaa tacttttccc cccaaaaagt taaaaaaata aagaaaagct aataggtagg 120
cagaatgtct tgagaccctt ctgttttcaa ggagagctct atgcagcgtg tgteccacacc 180
gaggtctgca gcagggcaga gtctccctga gcctgacttt gccagacctt cttgggtttg 240
gcctccggga gagcagccca gtctctgggt cgacgtcctt tctcagtc tggccacagt 300
tgtatcatat agcatctcta acatttcatt taggattatc tagtatagat cttactatat 360
ttggggctat gttgtatata atgttaacaa gaacatatct tctctgcata tatgtgtgaa 420
ttataaagaa aagcatgaga atgactctaa gttcaacaaa catgggtgaa tctctatgtg 480
ctcccagtggt cct 493

```

<210> 121

<211> 265

<212> DNA

<213> Homo sapiens

<400> 121

```

tggtagcctt gcagtaccgg tccggaattc ccgggtcgac ccacgcgtcc gcttctctgtt 60
ttctgttgct aaatgatgat aatgtgccat gatgttttat atatattcatt cagaaaaagt 120
tttatttttt aataacattc tattaacatt attttgcttg ccgctggcat gcctgaggaa 180
tgtatttggc tttgattaca cactaagttt ttgtaataaa tttgactcat taaaaacctt 240
tttttttaaa aaaaaaaaaa aaaaa 265

```

<210> 122

<211> 186

<212> DNA

<213> Homo sapiens

<400> 122

```

tttctgtttt ctgttgtaaa atgatgataa tgtgccatga tgttttatat atatcattca 60
gaaaaagttt ttttttttaa taacattcta ttaacattat tttgcttgcc gctggcatgc 120
ctgaggaatg tttttggctt tgattacaca ctaagttttt gtaataaatt tgactcatta 180
aaaacc 186

```

<210> 123

<211> 475
 <212> DNA
 <213> Homo sapiens

<400> 123
 cagcccgtcc gcggcctctc cagccccggg ttcgcgctct cgactccccc gaccaggtcc 60
 gcggtgcccc ggcggtgat gccaaatata gccatgaaga aaaagggtgct gctgatgggg 120
 aagagcgggt cggggaagac cagcatgagg tcgataatct tcgccaatta cattgctcgc 180
 gacacccggc gcctgggggc caccattgac gtggaacact cccacgtccg attcctaggg 240
 aacctggtgc tgaacctgtg ggactgtggc ggtcaggaca cttcatgga aaattacttc 300
 accagccagc gagacaatat cttccgtaac gtggaagttt tgatttacgt gtttgacgtg 360
 gagagccgcg aactggaaaa ggacatgcat tattaccagt cgtgtctgga ggccatcctc 420
 cagaactctc ctgacgcaa aatcttctgc ctggtgcaca aaatggatct gggtc 475

<210> 124
 <211> 122
 <212> DNA
 <213> Homo sapiens

<400> 124
 agaaggggtg ctggagccta ggacgtcgag gctgcagtga gatatgatca caccactgca 60
 ctccagcatg actgagttag accctgtctc aaaaaaaaaa aaaaaaaagt tttttttttt 120
 tc 122

<210> 125
 <211> 147
 <212> DNA
 <213> Homo sapiens

<400> 125
 ggagggggaag gttggtaggt aagctgtaac agattgctcc agttgcctta aactacgcac 60
 atagctaagt gaccaaactt cttgttttga tttgaaaaag tgcattgttt tcttgtccct 120
 ccctttgatg aaacggttacc ctttgac 147

<210> 126
 <211> 607
 <212> DNA
 <213> Homo sapiens

<400> 126
 cagtgaagac ttgcatgttg ttttcaactac tgtacacttg acctgcacat gcgagaaaaa 60
 ggtggaatgt ttaaaacacc ataatacagct cagggtatgt gccaatctga aataaaaagt 120
 ggatgggaga gtgtgtcctt cagatcaagg gtactaaagt ccctttcgtc gcagtgaagt 180
 agaggtatgt tgtgtgtgaa tgtacggatg tgtgtttgct tgcattgttt tgcattgtgt 240
 actgtgcatg ttatgtttct ccatgtgggc aaagatttga aatgtaagct tttatttatt 300
 attttagaat gtgacataat gagcagccac actcggggga ggggaagggt ggtaggtaag 360
 ctgtaacaga ttgctccagt tgccttaaac tacgcacata gctaagtgaac caaacttctt 420
 gttttgattt gaaaaaagtg cattgttttc ttgtccctcc ctttgatgaa acgttaccct 480
 ttgacgggcc ttttgatgtg aacagatgtt ttctaggaca aactataagg actaatttta 540
 aacttcaaac attccacttt tgaattttgt tttaaattgt tttatgtata gtaagcacia 600
 ctgtaat 607

<210> 127
 <211> 463
 <212> DNA
 <213> Homo sapiens

<400> 127
 attccaatta gccaggaatg gaaggatgag aagcgggatt tgctgactga aggacaaaagt 60
 tttagcagcc ttgatgaaga agccctggga tcccagacaca ggccagacct ggtccctagc 120
 actccatcac tgtttgaagc tgcctccttg gcaaccacaa tttcatcttc ttccttatac 180
 gtcaatgagc actatccaca cgacaggcct acactctatt caaacagcaa agggttacct 240

```

tccagttcaa catttacctt ggaagagggg accatctact tgaccgctga gccaacact 300
ctggaagtgc aggatgacaa tgcttctgtg cttgacgtct atttataagt gaaaatggtg 360
atcacctaag cacatggatg agacgtgagc acagttatgg cagagaagtt tctccgcacc 420
agaattatcc acagcaactt ggctgagccc cactacacac aga 463

```

<210> 128

<211> 592

<212> DNA

<213> Homo sapiens

<400> 128

```

ccaattagcc aggaatggaa ggatgagaag cgggatttgc tgactgaagg acaaagtttt 60
agcagccttg atgaagaagc cctgggatcc cgacacaggc cagacctggt ccctagcact 120
ccatcactgt ttgaagctgc ttcccttgga accacaattt catcttcttc cttatacgtc 180
aatgagcact atccacacga caggcctaca ctctattcaa acagcaaagg gttaccttcc 240
agttcaacat ttaccttgga agaggggacc atctacttga ccgctgagcc caacactctg 300
gaagtgcagg atgacaatgc ttctgtgctt gacgtctatt tataagtga aatggtgatc 360
acctaagcac atggatgaga cgtgagcaca gttatggcag agaagtttct ccgcaccaga 420
attatccaca gcaacttggc tgagccccac tacacacaga gaaatcatca acctgactta 480
agagttttca agatgtcaac ttcaggctga tcagcagatg ggatgtgaaa aatactaccc 540
tattctatca ttgtctgtt cttgctgaac tgtgaagaac tgcataaact at 592

```

<210> 129

<211> 251

<212> DNA

<213> Homo sapiens

<400> 129

```

caattagcca ggaatggaag gatgagaagc gggatttgc t gactgaagga caaagtttta 60
gcagccttga tgaagaagcc ctgggatccc gacacaggcc agacctggtc cctagcactc 120
catcactgtt tgaagctgct tccttggcaa ccacaatttc atcttcttcc ttatacgtca 180
atgagcacta tccacacgac aggcctacac tctattcaaa cagcaaaggg ttaccttcca 240
gttcaacatt t 251

```

<210> 130

<211> 229

<212> DNA

<213> Homo sapiens

<400> 130

```

gtagcagaag cctcattcca gaacctatct ggccagagaa gcagcagcat cctgggggat 60
ggcgtgtcat ggggtgtaca ctgctatatg gcataggccc ggcattggctg tcgctggacg 120
ccagctgtgc acaccagcc acacctgctg cagccgcgt tagtgtgcgg ctccgggcct 180
gagcattcgc aaagctcgt tctccaggga gctcctctt ggctttgga 229

```

<210> 131

<211> 316

<212> DNA

<213> Homo sapiens

<400> 131

```

cgccataacc tggtcagaag tgtgcctgtc ggcggggaga gaggcaatat caaggtttta 60
aatctcggag aaatggcttt cgtttgcttg gctatcggat gcttatatac ctttctgata 120
agcacaacat ttggctgtac ttcattctca gacaccgaga taaaagttaa cctcctcag 180
gattttgaga tagtggatcc cggatactta ggttatctct atttgcaatg gcaaccccca 240
ctgtctcttg atcattttta ggaatgcaca gtggaatatg aactaaaata ccgaaacatt 300
ggtagtga aa catgga 316

```

<210> 132

<211> 270

<212> DNA

<213> Homo sapiens

<220> .
 <221> misc_feature
 <222> 37
 <223> n = A,T,C or G

<400> 132
 agtcgccata acctgggtcag aagtgtgcct gtcggcnggg agagaggcaa tatcaagggtt 60
 ttaaatctcg gagaaatggc ttctgtttgc ttggctatcg gatgcttata tacctttctg 120
 ataagcacia catttggtg tacttcatct tcagacaccg agataaaagt taaccctcct 180
 caggattttg agatagtggg tcccggatac ttaggtttatc tctatttgca atggcaaccc 240
 ccactgtctc tggatcattt taaggaatgc 270

<210> 133
 <211> 341
 <212> DNA
 <213> Homo sapiens

<400> 133
 ttacatacgt ttttattact cggggggggac ctgtacgtca ccaatgcccc gcttcacggg 60
 ggcattgtagt gtgactcacg gctgaacaca aaatcactgt gaagcctgtg ctacagaagg 120
 atgtccagtc gctgaggcca ggagagaggt gggcaggcct gggctctggc gtggagacgg 180
 tcttccaggg agccgtttggg caggaagccg tacaccaggc agtagaagcc gttctgagca 240
 cagtagccag caaagtccac aatgtttggg tgacgaaacc tggacagctg ctccacctcg 300
 gtcaggaagc tctgcttcac tgcagtcac tccaggtcag c 341

<210> 134
 <211> 466
 <212> DNA
 <213> Homo sapiens

<400> 134
 attatgtgat taatgatttg acagccgttc caatctccac gtctccagaa gagattccac 60
 atgggagttt ctcagactga ttcttgacct ctcaatgaaa gtgttgaaac aggatgggaa 120
 atattttaca caggggaact gtgtcaatct gacagaagca ctgtcgctct atgaagaaca 180
 gctggggcgc ctgtattgtc ctgtggaatt ttcaaaggag atcgtctgtg tcccttcata 240
 cttggaattg tgggtatttt acactgtttg gaagaaagct aaacctgaa gatcagtagc 300
 ccctaatac atgtgctgca aatagccttc ctgacctcca tatgctgtac atgacatcaa 360
 aatgagtcag gcaattgatt gtgaattcct taaagttttc ctttttttaa taattatttt 420
 taattttaaaa aagcaaattg aaaatgtata ttttgatgag cttagg 466

<210> 135
 <211> 70
 <212> DNA
 <213> Homo sapiens

<400> 135
 agttttcctt tttttaataa ttatttttaa tttaaaaaag caaatggaaa atgtatattt 60
 tgatgagctt 70

<210> 136
 <211> 442
 <212> DNA
 <213> Homo sapiens

<400> 136
 tttttttttt tttttttcgg ctgagtataa agcttccttt tcttagggac catgcaaaga 60
 ttcttttgatt ctagaagtgc catttcatta tttctgtgac tcctgtctga atcatctgcc 120
 aggtaactat cttgattttg tcttagcaat cgacttagca gaccattctt ggagaaagaa 180
 aaatcctgag gtgaaacagg ctccgattta aagtcttcgg aactggtaa ggcaggtgcg 240
 cttctctgca cagcaggagc catacccaag aatggggcac tcttagcatc atggctcaag 300
 tgcacatttg tgttaggaat ttgtaagtca tcacaaggct cagattttat tttcaccatc 360

agtattttgtt cacttaaagc tctctctgag tgttcctgag tactttcatc tcttaaggga 420
gttttctctt ttttttcaact ct 442

<210> 137

<211> 275

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> 244

<223> n = A,T,C or G

<400> 137

agaaaaatc aaaaaatctg cattaaaaat attaatacctg catgctggac atgtatggta 60
ataatttcta ttttgtacca ttttctgttt aacttttagca tgttggtgat catggatcat 120
actcccctgt ttcttgggtg agaagggtac gccagtttgg aaactccggc ggctgcgtgc 180
ggggtttcag tccactgta ggcttgtaaa taccgccccg ccaaaccgca tagagacgtg 240
gcancactga gggctttgtt gggttatata cgtat 275

<210> 138

<211> 353

<212> DNA

<213> Homo sapiens

<400> 138

taagctcgga attcgggtcg aggaaaaata caaaaaatct gcattaaaaa tattaatcct 60
gcatgctgga catgtatggt aataatttct attttgtacc attttcttgt ttaacttttag 120
catgttggtg atcatggatc atactcccct tgtttctttg ggtgagaagg gatcgagtt 180
tggaactcc ggcggtgctg tgcgggggtt cagtcaccagc tgtaggcttg taaatacccg 240
ccccgccaaa ccgcatagag aacgtggcag caagctgagg gtctttgttt gggtttatta 300
ttacggtatt tttgtttgta agttaaaaaa aaaaaaaaaa ggggggggcc cca 353

<210> 139

<211> 559

<212> DNA

<213> Homo sapiens

<400> 139

gaatttgcc ctcgaggcca agaattcggc actagggcgc agaaggacca gcagaaagat 60
gccgaggcgg aagggtctgag cggcacgacc ctgctgccga agctgattcc ctccggtgca 120
ggccgggagt ggctggagcg gcgccgcgcg accatccggc cctggagcac ctccgtggac 180
cagcagcgct tctcacggcc ccgcaacctg ggagagctgt gccagcgctt cgtacgcaac 240
gtggagtact accagagcaa ctatgtgttc gtgttccttg gcctcatcct gtactgtgtg 300
gtgacgtccc ctatgttgct ggtggctctg gctgtctttt tcggcgccctg ttacattctc 360
tatctgcgca ccttgaggtc caagcttggtg ctctttggcc gagagggtgag cccagcgcat 420
cagtatgctc tggctggagg catctccttc cccttcttct ggctggctgg tgcgggctcg 480
gccgtcttct ggggtgctgg agccaccctg gtggtcatcg gctcccacgc tgccttccac 540
cagattgagg ctgtggacg 559

<210> 140

<211> 711

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> 444

<223> n = A,T,C or G

<400> 140

tttttttttt tttttttttg acaccataaa cagcttttatt ttcaaaggcg ggatccctcc 60

```

ccgggcttgt gatgggacgg cgctgtgggc ccgagcagca aagccgtgca ggacaggcat 120
gggcaggggt ggggcagctg gcccgggagg ccggcagggt ccaaaagaca cctcacacgg 180
gttccatctg cagctcctcc ccgtccacag cctcaatctg gtggaaggca gcgtgggagc 240
cgatgaccac cagggtggct cccagcacc cagaagacgg cgagcccgc ccagccagcc 300
agaagaaggg gaaggagatg cctccaqcca gagcatactg atgcgctggg ctcacctctc 360
ggccaaagag cacaagcttg gactccaagg tgcgcagata gagaatgtaa caggcgccga 420
aaaagaccag ccagagccac cagnacata ggggacgtca ccacacagta caggatgagg 480
cccaggaaca cgaacacata gttgctctgg tagtactcca cgttgctgac gaggcgctgg 540
cacagctctc ccaggttgcg gggccgtgag aagcgctgct ggtccacgaa ggtgctccag 600
gggcccgatg gtcgcgcggc gccgctccag ccaactcccg cctgcacccg gaggaatcag 660
cttcggcagc aaggtcgtgc cggtcagccc ttccgcctcg gcattcttct t 711

```

<210> 141

<211> 468

<212> DNA

<213> Homo sapiens

<400> 141

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actgcagtc cttcttctct ggctcttttg gaggtcatc caaaatagag gaagcatgcg 60
aaatctacgc cagagcagca aacatgttca aaatggccaa aaactggagt gctgctggaa 120
acgcgttctg ccaggctgca cagctgcacc tgcagctcca gagcaagcac gacgcagcca 180
cctgctttgt ggacgctggc aacgcattca agaaagccga cccccaagag gccattaact 240
gtttgatgcg agcaatcgag atctacacag acatggggccg attcacgatt gcggccaagc 300
accacatctc cattgctgag atctatgaga cagagttggt ggacatcgag aaggccattg 360
cccactacga gcagtctgca gactactaca aaggcgagga gtccaacagc tcagccaaca 420
agtgtctgct gaaggtggct ggttacgctg cgctgctgga gcagtatc 468

```

<210> 142

<211> 203

<212> DNA

<213> Homo sapiens

<400> 142

```

cgcaaagtga agaactcgca gtccttcttc tctggcctct ttggaggctc atccaaaata 60
gaggaagcat gcgaaatcta cgccagagca gcaaacatgt tcaaaatggc caaaaactgg 120
agtgtgctg gaaacgcgtt ctgccaggct gcacagctgc acctgcagct ccagagcaag 180
cacgacgcag ccacctgctt tgt 203

```

<210> 143

<211> 212

<212> DNA

<213> Homo sapiens

<400> 143

```

tctgcgggga acagaacatg atcggcatga cgcccacggt catcgctgag cattacctgg 60
ctgaaacgga gcagcgggag aagttcgggc taaagaagcg ggagggggcc tgggagctca 120
tgaagaaggg gtacaccag caactggcct tcatacaacc cagctctgcc tttgcggcct 180
tcgtgaaacg ggcaccagc acctggctga cc 212

```

<210> 144

<211> 226

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> 109, 128, 153, 161, 167, 174, 175, 178, 196, 202, 206, 211, 213

<223> n = A,T,C or G

<400> 144

```

gaagcacctc attgtgaccc cctcgggctg cggggaacag aacatgatcg gcatgacgcc 60

```


cacgggtcatc gctgtgcatt acctggatga aacggagcag tgggagaant tcggcctaga 120
 gaagcggcnag ggggccttgg agctcatcaa ganggggtac ncccagnagc tggnnntnag 180
 acaaccacgc tctgcntttg cnggcnttcg nanaaagggc cccac 226

<210> 145
 <211> 97
 <212> DNA
 <213> Homo sapiens

<400> 145
 ctgggctgcg gctgatgcgc atccgttttc ctgccctggg catgtgtctc tgaaaccgta 60
 tggcgggcg tgggcaacgg gcaactgctaa gggaggc 97

<210> 146
 <211> 120
 <212> DNA
 <213> Homo sapiens

<400> 146
 ggcacgagct catctgtttg cggatcagaa cccgagctgt gcttgtggct gcggctgcta 60
 actggctgcg cacagggagc tgtcaccatg cctcactcgt acccagccct ttctgctgag 120

<210> 147
 <211> 273
 <212> DNA
 <213> Homo sapiens

<400> 147
 ggccgcctt tttttttttt ttttttttcc cccctttttt ttgggtggggg ggtttttcca 60
 aggggttgaa tgggggtttt ttttcccccc ttttacccca gaaaaagggg gagggaaaaa 120
 ggaacccccg gggaaaattt tccttttttt ggaaaatttg ggggacccga aaaagggggg 180
 gggaaccccc cccctttttt ttttctttta aaaaattttt ttgcccccaa aaaaaggggg 240
 gcccccttct ccccccttct tgggccccgg ggg 273

<210> 148
 <211> 90
 <212> DNA
 <213> Homo sapiens

<400> 148
 cacttcatgc aaggcacatg tgctgtcctg caggtctgca gggaaccgac ccagagagcc 60
 cagcggcagg ccttgaaca cccgcctctg 90

<210> 149
 <211> 463
 <212> DNA
 <213> Homo sapiens

<400> 149
 gaattgtccg ggaatccggt gcttcggatc tactacacct cgaggcctgc tctgttcacc 60
 ttgtgtgctg ggaatgagct cttctactgc ctctctacc tgttccattt ctctgaggga 120
 ccttagttg gctctgtggg actgttcgga atgggcctct gggtcactgc ccccatcgcc 180
 ttgctgaagt cgctcatcag cgtcatccac ctgatcagcg ccgcccga catggctgcc 240
 ctggacgcag cagaccgcgc caagaagaag tgacgctgga gccccgggtc ctggctgccc 300
 acctgccctg ggagtcttgc tgtgccacac agctccccac cccctgctag gaggtcccag 360
 tctcagcct tctcatgtg ttgttctacc tgctgggatg ggggtcagcc tctctttggt 420
 gacgtcacgt tctctgggat cctgaggacc cgggcctcaa atc 463

<210> 150
 <211> 693
 <212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> 285, 455, 597, 606, 636, 667, 686

<223> n = A,T,C or G

<400> 150

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ggcacgagga gagagagagt cacaagatga tgcacttggt cgggaatccg gtgcttcgga 60
tctactacac ctcgaggcct gctctgttca ccttggtgtg tgggaatgag ctcttctact 120
gcctcctcta cctgttccat ttctctgagg gacctttagt tggctctgtg ggactgttcc 180
ggatgggcct ctgggtcact gcccccatcg ccttgctgaa gtcgctcatc agcgtcatcc 240
acctgatcac ggccgccccg aacatggctg ccctggacgc agcanaccgc gccagaaga 300
agtgacgctg gagccccggg tcctggctgc cacctgccct gggagtcttg ctgtgccaca 360
cagctcccca cccctgcta ggaggtccca gtctcacgcc ttctcatgt gttgttctac 420
ctgctgggat gggggtcagc ctctctttgg tgacntcacg ttcttctggg atcctgagga 480
ccgggcctca aatcagggag gatacccggg agggcccctt catccaagcg gtgcttctgg 540
ggtgccggga ccgggcagtg tcacaccctg cctgctagtc ctggggtcca gatctangga 600
ccttantgaa ggagtgggtg gaggcagttc tgaagnggat aactcgcca caacaagttg 660
ggacatncag aggaaactca actctnacgt ctt                                     693

```

<210> 151

<211> 300

<212> DNA

<213> Homo sapiens

<400> 151

```

gagagagaga gtcacaagat gatcgacttg tccgggaatc cgggtgcttcg gatctactac 60
acctcgaggc ctgctctgtt caccttgtgt gctgggaatg agctcttcta ctgcctcttc 120
tacctgttcc atttctctga gggaccttta gttggctctg tgggactgtt ccggatgggc 180
ctctgggtca ctgcccccat cgccttgctg aagtcgctca tcagcgtcat ccacctgatc 240
acggccgccc gcaacatggc tgccctggac gcagcagacc gcgccaagaa gaagtgcgc 300

```

<210> 152

<211> 300

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> 37, 41

<223> n = A,T,C or G

<400> 152

```

gacttgctcg ggaatccggt gcttcggatc tactacnct ngaggcctgc tctgttcacc 60
ttgtgtgctg ggaatgagct cttctactgc ctctctacc tgttccattt ctctgaggga 120
cctttagttg gctctgtggg actgttcagg atgggcctct gggctactgc ccccatcgcc 180
ttgctgaagt cgctcatcag cgtcatccac ctgatcacgg ccgcccgaac catggctgcc 240
ctggacgcag cagaccgcgc caagaagaag tgacgctgga gccccgggtc ctggctgccc 300

```

<210> 153

<211> 239

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> 168, 190, 203, 229

<223> n = A,T,C or G

<400> 153

gttgccctgc ctctggctcc agaacagaaa gggagcctca cgctggctca cacaaaacag 60
 ctgacactga ctaaggaaact gcagcatttg cacaggggag gggggtgcct ccttcctaga 120
 ggccttgggg gccaggctga ttggggggca gattgacata ggcccantc atcagatgtc 180
 tgaaattcan cacgggggta acntgggggg ttagggacta tttttaaant aggggtggc 239

<210> 154

<211> 113

<212> DNA

<213> Homo sapiens

<400> 154

gacacatttg ttacttcgtg agcaagcccg gaggtctgga gcccctgcc gtgttcacag 60
 gtgacacctt gtttgtggct ggctgcggga agttctatga agggactgct gat 113

<210> 155

<211> 294

<212> DNA

<213> Homo sapiens

<400> 155

tttttttttt tttttttttt ttttggcggg aataaatact tgttaaactt ctcttataaa 60
 tatgcattaa aacgtccgat aacacaagcc aagggtctga aaattaaggt taaatcaaga 120
 ctgaatttcc cgcacggacc agcaggaaag ccagttacct aaaagagcct aatccccaaa 180
 tccgctgaag gtgcaggcg gcctcagtc cggggcatct tgaactggc cttctccctg 240
 cgcacggccc gcatggtggt caccgggtcc gtctcacctg cgtgctgctg cacc 294

<210> 156

<211> 419

<212> DNA

<213> Homo sapiens

<400> 156

tagccatggc aggacagctc ctggaccagg tctcataatg catgtggcac ttaggtccaa 60
 gctctccaga ggggtgaaagc tggagtctgt caatgtccta ctgagacagc acagccaacc 120
 tagctagcaa catttgtttt agtctgaaca atatatactt atagaattca gtcaaagata 180
 cacaatctga aacagcttca tggggtggac tctaacagta gttgcaatgt tttagaatga 240
 gacttacttc tctgctatct agatctgaac tccttggtt ctttacttag ttcaagcccc 300
 agcctaggaa agccagttac ataaaagttg gtcaggagt cttagagctt tacctaaata 360
 gagcccagaa aacggaggat gggggtgggg cgcttctctg gaggtgacac ttgatgggg 419

<210> 157

<211> 357

<212> DNA

<213> Homo sapiens

<400> 157

cgtattgctg tcaagccgtg agctagccat ggcaggacag ctcttgacc aggtctcata 60
 atgcatgtgg cacttaggtc caagctctcc agagggtgaa agctggagtc tgtcaatgtc 120
 ctactgagac agcacagcca acctagctag caacatttgt tttagtctga acaatatata 180
 cttatagaat tcagtcaaag atacacaatc tgaacagct tcatggggtg gactctaaca 240
 gtagttgcaa tgttttagaa tgagacttac ttctctgcta tctagatctg aactccttgg 300
 cttctttact tagttcaagc ccagcctag gaaagccagt tacataaaag ttggctc 357

<210> 158

<211> 408

<212> DNA

<213> Homo sapiens

<400> 158

actttgtatc actgcagcgc ttcacacctt catcctgaag atatctggaa cattcgtagt 60
 atctgcagca ccaccaatat ccaatgcaag aacggcaaga tgaactgcca tgagggtgta 120

```

gtgaagggtca cagattgcag ggacacagga agttccaggg caccacaactg cagatatcgg 180
gccatagcga gcactagacg tgttgtcatt gcctgtgagg gtaaccacaca ggtgcctgtg 240
cactttgacg gttagatgcc accatgtagg gattatcgcg agtggttgac cttacactta 300
ctccttaaat agcagtgagt aatgcatttg agctgccccca ggctctgtct cctcagctca 360
tttcttactc tttttctcta tataactcat tctattaaat acattgca 408

```

<210> 159

<211> 550

<212> DNA

<213> Homo sapiens

<400> 159

```

acaaggacgc caaccccacc tagatgcaaa gcaggattca aaagaacatc tttgcgtttt 60
ctaccggctc cccatcatcg tactagggag gaagaagcgg gtgagaaaca aaactttctt 120
ccattgtcct gcccttttct gcggacttgt tctgaggccg aggcacctct aagatactga 180
tggctctgca gaggacccat tcattgtctc tgcttttgct gctgaccctg ctggggctgg 240
ggctgggtcca gccctcctat ggccaggatg gcatgtacca gcgattcctg cggcaacacg 300
tgcaccctga ggagacaggt ggcaagtgat gctactgcaa cttgatgatg caaagacgga 360
agatgacttt gtatcactgc aagcgcttca acaccttcat ccatgaagat atctggaaca 420
ttcgtagtat ctgcagcacc accaatatcc aatgcaagaa cggcaagatg aactgccatg 480
aggggtgtagt gaaggtcaca gattgcaggg acacaggaag ttccagggca cccaactgca 540
gatatcgggc 550

```

<210> 160

<211> 554

<212> DNA

<213> Homo sapiens

<400> 160

```

ccaacccac ctagatgcaa agcaggattc aaaagaacat ctttgcgttt tctaccggct 60
ccccatcatc gtactagggg ggaagaagcg ggtgagaaac aaaacttctt tccattgtcc 120
tgcccgtttc tgccgacttg ttctgaggcc gaggcacctc taagatactg atggctctgc 180
agaggaccca ttcatgtctt ctgcttttgc tgctgaccct gctggggctg gggctggtcc 240
agccctccta tggccaggat ggcatgtacc agcgattcct gcggcaacac gtgcaccctg 300
aggagacagg tggcagtgat cgctactgca acttgatgat gcaaaagacg aagatgactt 360
tgtatcactg caagcgcttc aacaccttca tccatgaaga tatctggaac attcgtagta 420
tctgcagcac caccaatatc caatgcaaga acggcaagat gaactgccat gagggtgtag 480
tgaaggtcac agattgcagg gacacaggaa gttccagggc acccaactgc agatatcggg 540
ccatagcgag cact 554

```

<210> 161

<211> 313

<212> DNA

<213> Homo sapiens

<400> 161

```

aattacatct tctttaaaagc caaatgggag atgccctttg accccaaga tactcatcag 60
tcaaggggcg tacttgagca ggaaaaagtg ggtaatggtg cccatgatga gtttgcac 120
cctgactata cttacttcc gggacgagga gctgtcctgc accgtggtgg agctgaagta 180
cacaggcaat gccagcgac tcttcatcct ccctgatcaa gacaagatgg aggaagtgga 240
agccatgctg ctcccagaga ccctgaagcg gtggagagac tctctggagt tcagagagat 300
aggtgagctc tac 313

```

<210> 162

<211> 519

<212> DNA

<213> Homo sapiens

<400> 162

```

cggccgccct tttttttttt tttggcccc cggggcccc ttatttttaa aacccccccc 60
ccccctgggg ggggggcccc gaccttttaa gttttttttt ttcccccg gggaaaaaaa 120
ggggggaaaa aaaaaaaaaa ttcccccccc tttttcccc ccccaaaaaa ggggggggacc 180

```

```

ccccggggggg ggggggggttt ccccggggggg gaaaaaaaaa acccccgggg gcccccccc 240
aatttttttcc cccccccctt tggggggggg gggggggggg gggggggggg gggggcccc 300
cccccccccc ccccccccat tttggggggg tgggttgggg gaaatttttt tttaaaaaa 360
aaaaaaaaaa atttgggggt ccccccccc ctttttttcc cccccctttt ttccaaaagg 420
ggaccccccc ccccccccc caaaaaaacc ccccccccc ccccaaaaaa aacccccccc 480
cggggggggga aaaaaaaggg gggggggggg ggccccccc 519

```

<210> 163

<211> 422

<212> DNA

<213> Homo sapiens

<400> 163

```

aactaaaaac tacagtggaa gaaaggaagt cttcagaagc ctccccact gcgcaaagaa 60
gtaaagatca cagtaaggaa tgcataaacg ctgccccaga ttctccgtcc aaacagcttc 120
cagaccagat ttcattcttc agtggaatc catcagttga aatagttcat ggtattatgc 180
acctatataa gacaaataag atgacctcct taaaagaaga tgtgcggcgc agtgccatgc 240
tgtgtattct cacagtccct gctgcaatga ccagtcatga ccttatgaag tttgttgccc 300
catttaacga agtaattgaa caaatgaaaa ttatcagaga ctctactccc aaccaatata 360
tgggtgctgat aaagtttcgt gcacaggctg atgcggatag tttttatatg acatgcaatg 420
gc

```

<210> 164

<211> 626

<212> DNA

<213> Homo sapiens

<400> 164

```

tacggccggg tgcgagctct gcgggaagcg gttcctggat agtttgcggc tgagaatgca 60
cttactggct cattcagcgg gtgcccagc ctttgtctgt gatcagtgcg gtgcacagtt 120
ttcgaaggag gatgccctgg agacacacag gcagaccat actggcactg acatggccgt 180
cttctgtctg ctgtgtggga agcgcatcca ggcgcagagc gcactgcagc agcacatgga 240
ggtccacgcg ggcgtgcgca gctacatctg cagtgaagtgc aaccgcacct tccccagcca 300
cacggctctc aaacgccacc tgcgctcaca tacaggcgac caccctacg agtgtgagtt 360
ctgtggcagc tgcttccggg atgagagcac actcaagagc cacaacgcga tccacacggg 420
tgagaaaccc tacgagtgca atggctgtgg caagaagttc agcctcaagc atcagctgga 480
gacgcactat aggggtgcaca caggtgagaa gccctttgag tgtaggctct gccaccagcg 540
ctcccgggac tactcggcc a gatcaagca cctgagaacg cacaacggcg cctcgcccta 600
ccagtgcacc atctgcacag agtact

```

<210> 165

<211> 515

<212> DNA

<213> Homo sapiens

<400> 165

```

gatagtttgc ggctgagaat gcacttactg gctcattcag cgggtgccaa agcctttgtc 60
tgtgatcagt gcggtgcaca gttttcgaag gaggatgcc tggagacaca caggcagacc 120
catactggca ctgacatggc cgtcttctgt ctgctgtgtg ggaagcgcat ccaggcgag 180
agcgactgc agcagcacat ggaggtccac gcggcgctgc gcagctacat ctgcagtga 240
tgcaaccgca ccttcccccag ccacacggct ctcaaacgcc acctgcgctc acatacaggc 300
gaccacccct acgagtgtga gttctgtggc agctgcttcc gggatgagag cacactcaag 360
agccacaaac gcatccacac gggtgagaaa ccctacagat gcaatggctg tggcaagaag 420
ttcagcctca agcatcagct ggagacgcac tatagggtgc acacaggtga gaagccctt 480
gagtgtaggc tctgccacca gcgtcccg gacta

```

<210> 166

<211> 615

<212> DNA

<213> Homo sapiens

<400> 166

```

actgttcaag gtttattggg ggttttagtt ggtataacac ttggatagtt gggtgcattg 60
tttgtatgta gatcttttta cattatatgg taatgtacac tactgatata gttcacaaaa 120
taagatcctt tggaagaatt atgcacaaga catgatattg gatttatata ctggatccca 180
ggatgtgact cactgggaaa aaatggttga ctaggcatgt tcagtgaagg agccaggaag 240
ttatataaca cacggtaaac atccacgttg ctcaaggggc aaatgcagta cgtacagcat 300
tggcagtggt gcgtcagagg tggcagaact atttcacact aaccagttga agactacaca 360
agattaatac catccagcat caggatatag ctgtggattt taaaaacat tcttatttct 420
aacttcagga gttgatgttt ttcccagtc atcttaaaat attactgctt taatcacaga 480
tcagataaaa aggacaacat gcacaacctc cacctagaat cctgttgtag cctagacagt 540
gaaatgatat gacatcagaa gactttaaaa ttgcagctcc ttttgatcc cccaaagtgt 600
atctgcactc ttctt 615

```

<210> 167

<211> 99

<212> DNA

<213> Homo sapiens

<400> 167

```

tttttttttt ccactgttca aggtttattg ggggttttag ttggtataac acttgatag 60
tgggttgcat tgttgtatg taaatcttt tacattata 99

```

<210> 168

<211> 612

<212> DNA

<213> Homo sapiens

<400> 168

```

tacggccggg acatgaagga gctaggagtg ggaatagctt tgcgaaaaat gggcgcaatg 60
gccaaaggcag attgtatcat cacttgtgat ggtaaaaacc tcaccataaa aactgagagc 120
actttgaaaa caacacagtt ttcttgtacc ctgggagaga agtttgaaga aaccacagct 180
gatggcagaa aaactcagac tgtctgcaac ttacagatg gtgcattggt tcagcatcag 240
gagtgggatg ggaaggaaa cacaataaca agaaaattga aagatgggaa attagtgggtg 300
gagtgtgtca tgaacaatgt cacctgtact cggatctatg aaaaagtaga ataaaaattc 360
catcatcact ttggacagga gtttaattaag agaattgtcca agctcagttc aatgagcaaa 420
tctccatact gtttctttct ttttttttca ttactgtgtt caattatctt tatcataaac 480
atttttacatg cagctatttc aaagtgtgct ggattaatta ggatcatccc tttggttaat 540
aaataaatgg gtttgtgcta atatatcttg tatgcattct ttaaacctta caggaaatta 600
gtgatgagtt tt 612

```

<210> 169

<211> 410

<212> DNA

<213> Homo sapiens

<400> 169

```

gaaaacaaca cagttttctt gtaccctggg agagaagttt gaagaaacca cagctgatgg 60
cagaaaaact cagactgtct gcaactttac agatggtgca ttggttcagc atcaggagtg 120
ggatgggaag gaaagcacia taacaagaaa attgaaagat gggaaattag tgggtggagtg 180
tgtcatgaac aatgtcacct gtactcggat ctatgaaaaa gtagaataaa aattccatca 240
tcactttgga caggagttaa ttaagagaat gtccaagctc agttcaatga gcaaattctc 300
atactgtttc tttctttttt tttcattact gtgttcaatt atctttatca taaacatttt 360
acatgcagct atttcaaagt gtgctggatt aattaggatc atccctttgg 410

```

<210> 170

<211> 310

<212> DNA

<213> Homo sapiens

<400> 170

```

gctcggaat tgcgtcgagt gctgctcccc acccatggac aggagatcct ggggtggggc 60
tccctctgat gacccagcc agatgagcga gtggggctca gcgtggccca tgggtgctgt 120
cactcagcat tcccatgcct gatgtttacc aagtgtgtg ttggacactg gctttctcca 180

```

aacaggatttt gcctcctcca cgctccctac acacctgaga tgtaaaactgg cagtcagtgt 240
 tcactcagga cctaggatta gaaaatggca gagttgggtgc tggatccacc ttgcacttct 300
 atcaagccct 310

<210> 171

<211> 257

<212> DNA

<213> Homo sapiens

<400> 171

tgctgctccc cagcccatgg acaggagatc ctgggttggg cctccctctg atgaccccag 60
 ccagatgagc gagtggggct cagcgtggcc catggtgcct gtcactcagc attccccatgc 120
 ctgatgttta ccaagtgtg tggttgacac tgactttctc caaacaggat ttgcctcctc 180
 cacgctccct acacacctga gatgtaaact ggcagtcagt gttcactcag gacctaggat 240
 tagaaaatgg cagagtt 257

<210> 172

<211> 593

<212> DNA

<213> Homo sapiens

<400> 172

tgaagaacgg tgccacttac gaagccaaaa tcaaggatgt ggatgagaaa gcagacatcg 60
 cactcatcaa aattgaccac cagggcaagc tgcctgtcct gctgcttggc cgctcctcag 120
 agctgcggcc gggagagttc gtggtcgcca tcggaagccc gttttccctt caaaacacag 180
 tcaccaccgg gatcgtgagc accaccacgc gaggcggcaa agagctgggg ctccgcaact 240
 cagacatgga ctacatccag accgacgcca tcatcaacta tggaaactcg ggaggcccgt 300
 tagtaaacct ggacggtgaa gtgattggaa ttaacacttt gaaagtgaca gctggaatct 360
 cctttgcaat cccatctgat aagattaaaa agttcctcac ggagtcccat gaccgacagg 420
 ccaaaggaaa agccatcacc aagaagaagt atattggtat ccgaatgatg tcaactcacgt 480
 ccagcaaagc caaagagctg aaggaccggc accgggactt cccagacgtg atctcaggag 540
 cgtatataat tgaagtaatt cctgataccc cagcagaagc tgggtggtctc aag 593

<210> 173

<211> 304

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> 106, 113, 125, 137

<223> n = A,T,C or G

<400> 173

gggtcaaagt tgagctgaag aacggtgcc a ttacgaagc caaaatcaag gatgtggatg 60
 agaaagcaga catcgactc atcaaaattg accaccaggg caagcngcct gtncgtgtgc 120
 ttgngcgtc ctcaganctg cggccgggag agttcgtggt cgccatcgga agcccgtttt 180
 cccttcaaaa cacagtcacc accgggatcg tgagcaccac ccagcgaggc ggcaaagagc 240
 tggggctccg caactcagac atggactaca tccagaccga cgccatcatc aactatggaa 300
 actc 304

<210> 174

<211> 258

<212> DNA

<213> Homo sapiens

<400> 174

ggtcagaaga gttgtgcacg cagattagca ggccaaggct tgagccacag cagcattttt 60
 atttcagatt ttgataactg ttatatgtg ttgaaaacca aaatgacatc tttttaaagc 120
 ttatccataa aaaaaaatag atgtctttta tagtgaaaaa acacatgggg aaaaaaatca 180
 tctattttga tgcagcattt gataatgata aaacacctca cacctcactc tttatagtgc 240
 acaaaatgaa tgagggtc 258

<210> 175
 <211> 442
 <212> DNA
 <213> Homo sapiens

<400> 175
 aagtagccgc tccgagtggc ggcgactggg ggctgaagag cgcgccgcc tctcgtccca 60
 ctttccagggt gtgtgatcct gtaaaattaa atcttccaag atgatctggt atatattaat 120
 tataggaatt ctgcttcccc agtctttggc tcatccaggc ttttttactt caattgggtca 180
 gatgactgat ttgatccata ctgagaaaga tctggtgact tctctgaaag attatattaa 240
 ggcagaagag gacaagttag aacaaataaa aaaatgggca gagaagttag atcggctaac 300
 tagtacagcg acaaaagatc cagaaggatt tggtgggcat ccagtaaag cattcaaatt 360
 aatgaaacgt ctgaatactg agtggagtga gttggagaat ctggtcctta agggatgtc 420
 agatggcttt atctctaacc ta 442

<210> 176
 <211> 611
 <212> DNA
 <213> Homo sapiens

<400> 176
 gggctgagggt aggaagtagc cgctccgagt ggaggcgact gggggctgaa gagcgcgcgcg 60
 cctctcgtc ccactttcca ggtgtgtgat cctgtaaaat taaatcttcc aagatgatct 120
 ggtatatatt aattatagga attctgcttc ccagtcctt ggctcatcca ggctttttta 180
 cttcaattgg tcagatgact gatttgatcc atactgagaa agatctggtg acttctctga 240
 aagattatat taaggcagaa gaggacaagt tagaacaat aaaaaaatgg gcagagaagt 300
 tagatcggct aactagtaca gcgacaaaag atccagaagg atttgttggg catccagtaa 360
 atgcattcaa attaatgaaa cgtctgaata ctgagtggag tgagttggag aatctgggtcc 420
 ttaagggat gtcagatggc tttatctcta acctaacat tcagagacag tactttccta 480
 atgatgaaga tcaggttggg gcagccaaag ctctgttacg tctccaggat acctacaatt 540
 tggatacaga taccatctca aagggtaatc ttccaggagt gaaacacaaa tcttttctac 600
 ggctgaggac t 611

<210> 177
 <211> 416
 <212> DNA
 <213> Homo sapiens

<400> 177
 ttacaaactc ctgaaccata atattctcgt ctccacagac acatactcca taattttaaaa 60
 ccaaagtctt gtgagaaagc ttgctcatca tacttgctgc ttcaaagaaa gactctgaat 120
 agtttctgtg tgctttatcc agaactttta aaagaacttc tgtttcatgc agttgaccgt 180
 agtctctctac ttctcttctg acgcctttta aaactcttctg aaaagtgcct tggccaaggc 240
 tttcattaaa tatcaaatct tcatttctga ttttgtgaaa caccatttgg ttcatatgag 300
 taggcctctg taatgttggg gaggttggta catcagaaac accattcgtt ctgaagacta 360
 gaagggttga tttatctttt cggcttttggg ggacagcatt tagtacacgg gaaaat 416

<210> 178
 <211> 163
 <212> DNA
 <213> Homo sapiens

<400> 178
 gggctttttt tttttgcaaa gttccaaatt tatgggtcgg gaaataaatc caaattttctc 60
 attaaaaaac tccttttgaa aaacttgggc ccaaaagttt cccatccgaa ctcagccttt 120
 tttgccccga tccccgactt ttttactcaa ggccccggaa ggc 163

<210> 179
 <211> 285
 <212> DNA
 <213> Homo sapiens

<400> 179

```

aaagttacaa atttattggt ctggaaataa atacaaatat ctcattaaga aactcctctg 60
gaaagacttg tgcacaatag tttcccatcc gtactcagcc tctcttgccc cgatccccga 120
cttttctact caaggccagg gaaaggcctc caagggtgatg ggcggcaggt aacgagtcac 180
tgacctctcac gccacctgga aggctggact acttccctct cccaactgcg ggggtcccaga 240
aatcctcggg tcccagtggc tgacttacaa tattcaattc actct 285

```

<210> 180

<211> 458

<212> DNA

<213> Homo sapiens

<400> 180

```

tcgagccgcc gccgcccctg tacaacaaca acaacaactg cgaggaaaat gagcagtcctc 60
tgcccccgcc ggccggcctc aacagttcct ggggtggagct acccatgaac agcagcaatg 120
gcaatgataa tggcaatggg aaaaatgggg ggctggaaca cgtaccatcc tcctcctcca 180
tccacaatgg agacatggag aagattcctt tggatgcaca acatgaatca ggacagagta 240
gttccagagg cagttctcac tgtgacagcc cttcgccaca agaagatggg cagatcatgt 300
ttgatgtgga aatgcacacc agcagggacc atagctctca gtcagaagaa gaagttgtag 360
aaggagagaa ggaagtcgag gctttgaaga aaagtgcgga ctgggtatca gactggtcca 420
gtagacccca aaacattcca cccaaggagt tccacttc 458

```

<210> 181

<211> 329

<212> DNA

<213> Homo sapiens

<400> 181

```

tttttttttt tttttttttt tttcttttta ataactatca actcaaactt agggaaactt 60
gcctttgtct tgggggaaaa aaacaactag acaataaagc ttcttttaca tcatttgcta 120
acctgatctc gttttaagag agagatggta gttatgttgc aagagtaaaa tttataccat 180
gaatgatata ggtctagtct ggtggcacta attagagata atagcattgc tgacaaaatt 240
ataatctgct ggtggcattt gcggaaaaga ggcccttgca aatttctaaa caacagtaaa 300
ctctgttagg aaattctaaa atgtcttca 329

```

<210> 182

<211> 527

<212> DNA

<213> Homo sapiens

<400> 182

```

atacatgtaa cttcattatt ttaaaaaatat ttttagaact ccaatactca ccctgttatg 60
tcttgctagt ttaaattttg ctaattaact gaaacatgct taccagattc acactgttcc 120
agtgtctata aaagaaacac tttgaagtct ataaaaata aaataattat aaatgtcatt 180
gtacatagca tgtttatatc tgcaaaaaac ctaatagcta attaactctgg aatatgcaac 240
attgtcctta attgatgcaa ataacacaaa tgctgcaaag aaatctacta tatcccttaa 300
tgaaatacat cattcttcat atatttctcc ttcagtccat tcccttaggc aatttttaat 360
ttttaaaaaat tattatcagg ggagaaaaat tggcaacgct attatatgta agggaaatat 420
atacaaaaag aaaattaatc atagtcacct gactaagaaa ttctgactgc tagttgccat 480
aaataactca atggaaatat tcctatggga taatgtattt taagtga 527

```

<210> 183

<211> 530

<212> DNA

<213> Homo sapiens

<400> 183

```

atacatacat gtaacttcat tatttttaaaa atatttttag aactccaata ctcaccctgt 60
tatgtcttgc taattttaaat tttgctaatt aactgaaaca tgcttaccag attcacactg 120
ttccagtgtc tataaaaagaa acactttgaa gtctataaaa aataaaaataa ttataaatat 180
cattgtacat agcatgttta tatctgcaaa aaacctaata gctaattaat ctggaatatg 240

```

```

caacattgtc cttaattgat gcaaataaca caaatgctca aagaaatcta ctatatccct 300
taatgaaata catcattctt catatatctt tccttcagtc cattccctta ggcaattttt 360
aattttttaa aattattatc aggggagaaa aattggcaaa actattatat gtaagggaaa 420
tatatacaaa aagaaaatta atcatagtca cctgactaag aaattctgac tgctagttgc 480
cataaataac tcaatggaaa tattcctatg ggataatgta ttttaagtga 530

```

<210> 184

<211> 253

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> 98, 141, 162, 213

<223> n = A,T,C or G

<400> 184

```

tatatacaca tgtaacttca ttatttttaa aatattttta gaactccaat actcaccctg 60
ttatgtcttg ctaattttaa ttttgctaata taactganac atgcttacca gattcacact 120
gttccagtgt ctataaaaga nacactttga agtctataaa anataaaata attataaata 180
tcattgtaca tagcatgttt atatctgcaa aanacctaag agctaattaa tctggaatat 240
gcaacattgt cct 253

```

<210> 185

<211> 421

<212> DNA

<213> Homo sapiens

<400> 185

```

ccgttgctgt cgatcccagc tccttgggag gctgaggcgg gagaattgcg ggaaggcggg 60
gacggaggtt gcagtgcgac gagatcgac tgctgtaccc agcctgggcc acagtgcagg 120
actccatctc aaaaaaaaaa gaaaagaaaa agcctgttta atgcacaggt gtgagtggat 180
tgcttatggc tatgagatag gttgatctcg cccttaccoc ggggtctggt gtatgctgtg 240
ctttcctcag cagtatggct ctgacatctc ttaaattgtcc caacttcagc tgttgggaga 300
tggtgatatt ttcaacccta cttcctaaac atctgtctgg gggttcctta gtcttgaatg 360
tcttatgctc aattatttgg tggtgagcct ctcttcacaa agagctcctc catgtttgga 420
t 421

```

<210> 186

<211> 377

<212> DNA

<213> Homo sapiens

<400> 186

```

cagctccttg ggaggctgag gcgggagaat tgcttgaacc cggggacgga ggttgcagtg 60
agccgagatc gcaactgctgt acccagcctg ggccacagtg caagactcca tctcaaaaaa 120
aaaagaaaag aaaaagcctg tttaatgcac aggtgtgagt ggattgctta tggctatgag 180
ataggttgat ctgcacctta ccccggggtc tggtgtatgc tgtgctttcc tcagcagtat 240
ggctctgaca tctcttagat gtcccaactt cagctgttgg gagatgggtga tattttcaac 300
cctacttctt aaacatctgt ctgggggttcc tttagtcttg aatgtcttat gctcaattat 360
ttggtgttga gcctctc 377

```

<210> 187

<211> 243

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> 228

<223> n = A,T,C or G

<400> 187

```

gaggtattcc acctcctacc ggaatataat taaagggaga aatacactgt atgaagtata 60
tggtgatact atgacatggt gccaacacct tgagaagcat ttttggttc taataaaagt 120
aatggctttg tcaatatatt ggtgggttta aaactttgct gcttttttac ataaagcctg 180
tgcctttcct agaaagttaa gatgtaaagtg tttctcaca tgtaaantg aaagttcagg 240
ggt                                     243

```

<210> 188

<211> 544

<212> DNA

<213> Homo sapiens

<400> 188

```

tattccacct cctaccggaa tataattaaa gggagaaata cactgtatga agtatatggt 60
gatactatga catgttgcca acaccttgag aagcattatt tgtttctaataaaaagtaatg 120
gctttgtcaa tatattggtg ggtttaaaac ttgtctgctt ttttacataa agcctgtgcc 180
tttcctagaa agttaagatg taaatgtatt ctacatgta aatttgaaag ttcaggggtc 240
tattatgaaa tgatacacat ttttaaata accataattt ttttactaa gctgtttgcc 300
ttccaaagtg tttacacctt aagccttaac atgtatcttc attcagaaaa cagttatatt 360
gtcataccat agtaggaaga aaaaccttta ttggaatat acactactgt aagtttgtac 420
agatcatata cctaccacct gtctttgctt aaagagcctt gattacataa atatgtagga 480
aaaaacatat tgagttcaaa atttatatct aacattgttt atgttatgat ttttttttaa 540
ttgc                                     544

```

<210> 189

<211> 244

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> 210

<223> n = A,T,C or G

<400> 189

```

cacaaaaggt atgatcagca acttgcttgg gaaaggagcc gtggaccagc tgacacggct 60
ggtgctgggtg aatgccctct acttcaacgg ccagtggaag actcccttcc ccgactccag 120
caccacccgc cgcctcttcc acaaatcaga cggcagcaact gtctctgtgc ccatgatggc 180
tcagaccaac aagttcaact atactgagtn caccacgccc gatggccatt atacgacatc 240
ctgg                                     244

```

<210> 190

<211> 209

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> 140

<223> n = A,T,C or G

<400> 190

```

gaacactggt gctcttggtg gacgggcccga gaggaattca gagttaaaacc ttgagtgcct 60
gcgtccgtga gaattcagca tggaatgtct ctactatttc ctgggatttc tgctcctggc 120
tgcaagattg ccacttgatn ccgccaaacg atttcatgat gtgctgggca atgaaagacc 180
ttctgcttac atgaggaggc acaatcaat                                     209

```

<210> 191

<211> 254

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> 85, 100, 143, 155, 182, 203, 229, 245, 254

<223> n = A,T,C or G

<400> 191

```

ctcccaacca agctctcttg aggatcttga aggaaactga attcaaaaag atcaaagtcc 60
tgggctccgg tgcgttcggc acgnggtata agggactctn gatcccagaa ggtgagaaag 120
ttaaaattcc cgtcgctatc aangaattaa gagangcaac atctccgaaa gccaacaagg 180
anattcctga tgaagcctac gtnatggcca gcgtggacaa ccccccacng tgccgcctgc 240
tggnnatctg tctn                                     254

```

<210> 192

<211> 484

<212> DNA

<213> Homo sapiens

<400> 192

```

tttttttttt tttttttttc aaatatacct ctttgaaaga taaatttctg ctcaaaggga 60
caatatcttt gctggatgcg ttctgtgtaa tgcttcacag ttggaagaca aaggaaatgca 120
acttcccaaa atgtgcccgä ggtggaagta cttcctggct agtcggtgta aacgttgcaa 180
aaccagtctg tgggtctaag agctaattgcg ggcatggctg ttgggatgga ggacctgctg 240
tggtttggtc ctgggtatcg aaagagtctg gatttttagg gtcatacta tcctccgtgg 300
tcatactcca ataaattcac tgctttgtgg cgcgaccctt aggtattctg cattttcagc 360
tgtggagccc ttaaagatgc catttggtt ggcttccttg ggaaagaagt cctgctggtg 420
gtcagggttg tccaggctaa tttggtggct gcctttcttg gccagtgagg cagggtgctg 480
gaat                                     484

```

<210> 193

<211> 660

<212> DNA

<213> Homo sapiens

<400> 193

```

tttaatcata tccaggagtt tgcaagaaac aggtgcttaa cactaattca cctcctgaac 60
aagaaaaatg ggctgtgacc ggaactgtgg gctcatcgct ggggctgtca ttggtgctgt 120
cctggctgtg tttggaggta ttctaattgcc agttggagac ctgcttatcc agaagacaat 180
taaaaagcaa gttgtcctcg aagaaggtag aattgctttt aaaaattggg ttaaaacagg 240
cacagaagtt tacagacagt tttggatctt tgatgtgcaa aatccacagg aagtgatgat 300
gaacagcagc aacattcaag ttaagcaaag aggtccttat acgtacagag ttcgttttct 360
agccaaggaa aatgtaaccc aggacgctga ggacaacaca gtctctttcc tgcagcccaa 420
tggtgccatc ttcgaacctt cactatcagt tggaacagag gctgacaact tcacagttct 480
caatctggct gtggcagctg catcccatat ctatcaaaat caatttggtc aaatgatcct 540
caattcactt attaacaagt caaaatcttc tatgttccaa gtcagaactt tgagagaact 600
gttatggggc tatagggatc cattttttgag tttggttccg taccctgtta ctaccacagt 660

```

<210> 194

<211> 277

<212> DNA

<213> Homo sapiens

<400> 194

```

ctttaatcat atccaggagt ttgcaagaaa cagggtgctta acactaattc acctcctgaa 60
caagaaaaat gggctgtgac cggaactgtg ggctcatcgc tggggctgtc attggtgctg 120
tcctggctgt gtttgagggt attctaattgc cagttggaga cctgcttatc cagaagacaa 180
ttaaaaagca agttgtcctc gaagaaggta caattgcttt taaaaattgg gttaaaacag 240
gcacagaagt ttacagacag ttttggtatc ttgatgt                                     277

```

<210> 195

<211> 457

<212> DNA

<213> Homo sapiens

<400> 195

```

gactggggttt ggggtgcagac gttgtttgctt gggcgcttct ccgctgcgtg taggtgaagg 60
gggcttcctg accgagacat ggatttaggt gctattacaa aatactcagc attacacgcc 120
aagcccaatg gactgacct tcaatacggg actgctggat ttcgaacgaa ggcagaacat 180
cttgatcatg tcatgtttcg catgggatta ttagctgtcc tgagggtcaaa acagacaaaa 240
tccactatag gagtcatggg aacagcgctc cacaatcctg aggaagacaa tgggtgtaaaa 300
ttggttgatc ctttgggtga aatgttggca ccacctcggg aggaacatgc cacctgttta 360
gcaaatgctg aggaacaaga tatgcagaga gtgcttattg acatcagcga gaaagaagct 420
gtgaatctgc aacaagatgc ctttgtagtt attggta 457

```

<210> 196

<211> 361

<212> DNA

<213> Homo sapiens

<400> 196

```

tttttttttt tttttttttt tttgggcagg agaccatgtt actttattca tttgtttaac 60
tttaaccatg ttcaataaac ttttcacctg tttgggtgagt tccacaaaag ccttagagag 120
tttctggtag taaccttcta tagttgcctt tccatatcgg ccacccgtgt ttcgacaata 180
caccatgtag tgcagctggg gtgttggtta caagccataa tcatggaatt gacctcctag 240
aacagtcaca ccatctatta cagattgtga aagtttctca ctgctgggcc tggatatctt 300
accaataact acaaaggcat cttgttgcag attcacagct tctttctcgc tgatgtcaat 361
a

```

<210> 197

<211> 551

<212> DNA

<213> Homo sapiens

<400> 197

```

gagccgagct gatttgatcg aggagcgcgg ttaccggacg ggctgggtct atgggtcgctc 60
cgcgggccgc tccgcgggct ggtgcttttt tatcagggca agctgtgttc catggcaggg 120
aacttttggc agatctccca ctatttgcaa tggatttttg ataaacaaga tctgttgaag 180
gagcgccaaa aggattttaa gtttctctca gaggaagaat attggaagtt acaaatattt 240
tttacaaatg ttatccaagc attaggtgaa catcttaaat taagacaaca agttattgcc 300
actgctacgg tatatttcaa gagattctat gccaggatatt ctctgaaaag tatagatcct 360
gtattaatgg ctctacatg tgtgtttttg gcatccaaag tagaggaatt tggagtagtt 420
tcaaatacaa gattgattgc tgctgctact tctgtattaa aaactagatt ttcatatgcc 480
tttccaaagg aatttcctta taggatgaat catatattag aatgtgaatt ctatctgtta 540
gaactaatgg a 551

```

<210> 198

<211> 637

<212> DNA

<213> Homo sapiens

<400> 198

```

tacggccggg agtcgagccg agctgatttg atcgaggagc gcgggttaccg gacgggctgg 60
gtctatggtc gctccgcggg ccgctccgcc ggctgggtgct tttttatcag ggcaagctgt 120
gttccatggc agggaaacttt tggcagagct cccactattt gcaatggatt ttggataaac 180
aagatctggt gaaggagcgc caaaaggatt taaagtttct ctcagaggaa gaatattgga 240
agttacaaat attttttaca aatgttatcc aagcattagg tgaacatctt aaattaagac 300
aacaagttat tgccactgct acggtatatt tcaagagatt ctatgccagg tattctctga 360
aaagtataga tcctgtatta atggctccta catgtgtgtt tttggcatcc aaagtagagg 420
aatttggagt agtttcaaat acaagattga ttgctgctgc tacttctgta ttaaaaaacta 480
gattttcata tgcctttcca aaggaatttc cttataggat gaatcatata ttagaatgtg 540
aattctatct gttagaacta atggattgtt gcttgatagt gtatcatcct tatagacctt 600
tgctccagta tgtgcaggac atgggccaag aagacat 637

```

<210> 199

<211> 130
<212> DNA
<213> Homo sapiens

<400> 199
tagaaagcct ccacctggag tacaatgccc tcaaggctct tcacaatggc accctggctg 60
agttgcaagg tctacccac attaggggtt tcttggaaca caatccctgg gtctgcgact 120
gccacatggc 130

<210> 200
<211> 372
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> 29, 100, 297, 298, 353, 357
<223> n = A,T,C or G

<400> 200
gtgctgtttg accaatggct atgtggccna gattggggac ttcgggctgg ctaggggacat 60
catgaatgac tccaactaca ttgtcaaggg caatgccgcn ctgcctgtga agtggatggc 120
cccagagagc atctttgact gtgtctacac gggtcagagc gacgtctggt cctatggcat 180
cctcctctgg gagatcttct cacttgggct gaatccctac cctggcatcc tggatgaacag 240
caagttctat aaactgggtga aggatggata ccaaattggcc cagcctgcat ttgcccnnaa 300
gaatatatac agcatcatgc aggcctgctg ggcttggggag cccacccaca gancanctt 360
ccagcagatc tg 372

<210> 201
<211> 478
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> 3, 10, 11, 78, 112, 130, 150, 231, 457
<223> n = A,T,C or G

<400> 201
gancacctgn nacaaggagg atggacggcc cctggagctc cgggacctgc ttcacttctc 60
cagccaagta gcccaggat ggccttctc gcttccaaga attgcatcca cngggacgtg 120
gcagcgcgtn acgtgctgtt gaccaatggn catgtggcca agattgggga cttcgggctg 180
gctagggaca tcatgaatga ctccaactac attgtcaagg gcaatgccgc nctgcctgtg 240
aagtggatgg ccccagagag catctttgac tgtgtctaca cggttcagag cgacgtctgg 300
tcctatggca tcctcctctg ggagatcttc tcacttgggc tgaatcccta ccctggcatc 360
ctggatgaaca gcaagttcta taaactgggt gaaaggatgg ataccaaatg gccagcctg 420
cattttgccc ccaaagaata tatacaagca tccatgnagg cccttctggg ccttggag 478

<210> 202
<211> 218
<212> DNA
<213> Homo sapiens

<400> 202
gcgagcaagg ggatatcgcc cagcccttgc tgcagcccaa caactatcag ttctgctgag 60
gagttgacga cagggagtag cactctcccc tcccacaaac ttcaactcct ccatggatgg 120
ggcgacacgg ggagaacata caaactctgc cttcgggtcat ttcactcaac agctcggccc 180
agctctgaaa cttgggaagg tgagggatc aggggagg 218

<210> 203
<211> 556
<212> DNA

<213> Homo sapiens

<400> 203

```

taagctcgga attcggctcg aggcgagcaa ggggatatcg cccagccctt gctgcagccc 60
aacaactatc agttctgctg aggagttgac gacagggagt accactctcc cctcccacaa 120
acttcaactc ctccatggat ggggcgacac ggggagaaca taaaaactct gccttcgggtc 180
atttcaactc acagctcggc ccagctctga aacttgggaa ggtgagggat tcaggggagg 240
tcagaggatc ccacttcctg agcatgggcc atcactgcca gtcaggggct gggggctgag 300
ccctcaccac cccctccctt actgttctca tgggtgtggc ctctgtgttg ctatgccaac 360
tagtagaacc ttcttttcta atccccctt cttcatggaa atggactgac tttatgccta 420
tgaagtcccc aggagctaca ctgatactga gaaaaccagg ctctttgggg ctagacagac 480
tggcagagag tgagatctcc ctctctgaga ggagcagcag atgctcacag accacactca 540
gctcaggccc cttgga 556

```

<210> 204

<211> 319

<212> DNA

<213> Homo sapiens

<400> 204

```

tccttatttta ttttaacttca cccgagttcc tctgggtttc taagcagtta tgggtgatgac 60
ttagcgtcaa gacatttgct gaactcagca cattcgggac caatatatag tgggtacatc 120
aagtccatct gacaaaatgg ggcagaagag aaaggactca gtgtgtgatc cgggtttcttt 180
ttgctcgccc ctgttttttg tagaatctct tcatgcttga catacctacc agtattattc 240
ccgacgacac atatacatat gagaatatac cttatttatt tttgtgtagg tgtctgcctt 300
cacaaatgtc atgtctact 319

```

<210> 205

<211> 456

<212> DNA

<213> Homo sapiens

<400> 205

```

attccgttgc tgtcgagggt cactaccagt acaagagcat ccctgtggag gacaaccaca 60
aggcagacat cagctcctgg ttcaacgagg ccattgactt catagactcc atcaagaatg 120
ctggaggaag ggtgtttgtc cactgccagg caggcatttc ccggtcagcc accatctgcc 180
tggcttacct tatgaggact aatcgagtca agctggacga ggcctttgag tttgtgaagc 240
agaggcgaag catcatctct cccaacttca gcttcatggg ccagctgctg cagtttgagt 300
cccaggtgct ggctccgcac tgttcggcag aggtctggag ccccgccatg gctgtgctcg 360
accgaggcac ctccaccacc accgtgttca acttccccgt ctccatccct gtccactcca 420
cgaacagtgc gctgagctac cttcagagcc ccatta 456

```

<210> 206

<211> 533

<212> DNA

<213> Homo sapiens

<400> 206

```

agtttttaaa taatgaatat tatttaatac cacaacagaa ttatcccaa tttccaataa 60
gtcctatcat tgaaaattca aatataagtg aagaaaaaat tagtagatca acaatctaaa 120
caaatccctc ggttctaaga tacaatggat tccccatact ggaaggactc tgaggcttta 180
ttccccact atgcatactt tatcatttta ttattatata cacatccatc ctaaaactata 240
ctaaagccct tttcccatgc atggatggaa atggaagatt tttttttaac ttgttctaaa 300
agtcttaata tgggctgttg ccatgaaggc ttgcagaatt gagtccattt tctagctgcc 360
tttattcaca tagtggacgg ggtacctaaa agtactgggg ttgactcaga gagtcgctgt 420
cattctgtca ttgctgctac tctaactctg agcaacactc tcccagtgcc agatccctcg 480
tatcattcca agaggagcat tcatcccttt gctctaataa tcaggaatga tgc 533

```

<210> 207

<211> 246

<212> DNA

<213> Homo sapiens

<400> 207

```

aatgcactaa ctcaatacca agatgagttt ttaaataatg aatattattt aataccacaa 60
cagaattatc cccaatttcc aataagtcct atcattgaaa attcaaatat aagtgaagaa 120
aaaattagta gatcaacaat ctaaacaat ccctcggttc taagatacaa tggattcccc 180
atactggaag gactctgagg ctttattccc ccactatgca tatcttatca ttttattatt 240
atacac 246

```

<210> 208

<211> 407

<212> DNA

<213> Homo sapiens

<400> 208

```

ggcgcgcctt tttttttttt tttttttttt ttttttttgg gcaaaaagg gctttttttt 60
ttttccccc cctttttttt aacccttccc ctaatatattt ccccaaaaaa aaaaattttt 120
tttttttggg ggggggaaaa aaaaggga aaacacccc ccccccggg ggggaaaaaa 180
accccccaaa aacccccctt ttgggggggt cccccccat ggggggttccc cccccaattt 240
ttttccccc ccccaaaaaa tttttaaccc ccccccaagg ggggtgaaaa ccttaaaaaa 300
aaccccccg aaaaaccaa acccctttt taaaaaaaa aaaaaaattt ttgggggggca 360
aaaccccccc ccccaaaaaa accccccccc ccccccctta aaaaaaa 407

```

<210> 209

<211> 359

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

```

<222> 1, 53, 121, 123, 128, 133, 142, 150, 174, 179, 183, 186,
196, 200, 201, 204, 207, 212, 215, 218, 224, 229, 230, 231,
243, 244, 249, 260, 261, 267, 268, 270, 273, 279, 289, 291,
295, 301, 303, 305, 312, 315, 337, 345, 357

```

<223> n = A,T,C or G

<400> 209

```

ncggggactg cgcggcggtg cagagccggg cgtgggcgag aacgaacggg ctncctgcgg 60
ctgagagcgt cgagtgtcac catgggtatc acgcttggag ctctctaaag gacttcttgg 120
ncngggcctc gcncctgccg tntccaagan cccggtcggc cccaatcgag aggncaaaac 180
tgntgntgaa ggtgcnagan nccnagnaac angtnaantc ttangaagnn ntacaaagg 240
gtnnattant tttttggtan nattccnnan gancaaggnt ttcctttcnt nttgnagggt 300
nancntggca angtnattcc ttaatttccc aaccaangtt ttaantttgg cttaang 359

```

<210> 210

<211> 394

<212> DNA

<213> Homo sapiens

<400> 210

```

ttttttttt gcattaagtg gtctttattg atgtttcaca ttcagttatt atcaattctt 60
cagttaattg tacaagtatg ataaattatt ttctatttgc tgtgggaatt taaatgtaaa 120
ataaatcaaa aatacatgtg tggtttaagt aacactcaat gaagcatctc ttctgaggta 180
ttcctttcag tctggtttta tcccaggatc tttttacttc ccttaggaat agtctattaa 240
accacacaat ggatctgtga actttagat caagttcact gtaaactctgt gaacttgtgt 300
tttaattaca ttagacatat tttttgatct catcatacaa caccaatata aaaggcaccg 360
cccatgcctc tcaggcacat tgggaccggg cacc 394

```

<210> 211

<211> 292

<212> DNA

<213> Homo sapiens

<400> 211

```

gggagccac cagcaagaat gagttggagc aatcttttca tgtgacctcc ttaacagata 60
tttactgaag gaatctaggt tgtatttttca gtggacaatg ggaataaagc atttctaaag 120
caccgactgg agaggaaggc aacagagaca aggagagaag ccgagagaca tgtctgcgtg 180
ctgccacgca tttgagcgat tgctctgtga agagttgtac actgaacact ttcaggggag 240
gctgtttacc caggcaatgt cctcaaâcaa gcctgtgccc ggggtgcctg ga 292

```

<210> 212

<211> 495

<212> DNA

<213> Homo sapiens

<400> 212

```

aattccggtt ctgtcgtctg gccaggttaa tttgagcaaa ggccacagtg aactccggcg 60
tggctgagga aggaggaggc acccacaggc tgctgggagg agagcataag gctcaaatg 120
gaaaatcata aatccaataa taaggaaaac ataacaattg ttgatatac cagaaaaatt 180
aaccagcttc cagaagcaga aaggaatcta cttgaaaatg gatcggttta tgttgatta 240
aatgctgctc tttgtggcct catagcaaac agtcttttcc gacgcattct gaatgtgaca 300
aaggctcgca tagctgctgg cttaccaatg gcagggatac cttttcttac aacagactta 360
acttacagat gttttgtaag ttttcctttg aatacagggtg atttggattg tgaaacctgt 420
accataacac ggagtggact gactgggtctt gttattgggtg gtctataccc tgttttcttg 480
gctatacctg taaat 495

```

<210> 213

<211> 358

<212> DNA

<213> Homo sapiens

<400> 213

```

tgcgaccgcg atctcctgca gctgggtgcac cacctcggcg atggacagcc gtcctccgg 60
gttcacctgc agcatggcga ggatgaggct gtggaagacc gtgtactcg tgctgtcgcg 120
ggggatcgag tacttcccat tgactattcg aagtttcgct ccattcctcaa aagggtgctg 180
ccggaagcac agcaggatca agatgcagcc caggggccag atatcctgct tctcgccgat 240
cgggaagttg gaatacaagt ctatgatttc tgggtgttcta tacattgggtg ttgtattcct 300
cgtgatctga aaaaatacaa acatttcaaa ggaaaagtgt catcccacaa acagtatt 358

```

<210> 214

<211> 406

<212> DNA

<213> Homo sapiens

<400> 214

```

tggtagcct gcaggtagcg gtccggaatt cccgggtcga cccacgcgtc cgaggacatc 60
tggaatgtca ctggtgcccc ggtgtacttg agctgtgagg tcactcggaat cccgacacct 120
gtcctcatct ggaacaaggt aaaaaggggt cactatggag ttcaaaggac agaactcctg 180
cctggtgacc gggacaacct ggccattcag acccggggtg gccagaaaa gcatgaagta 240
actggctggg tgctggtatc tcctctaagt aaggaagatg ctggagaata tgagtgccat 300
gcatccaatt cccaaggaca ggcttcagca tcagcaaaaa ttacagtggg tgatgcctta 360
catgaaatac cagtgaaaaa aggtgaaggt gccgagctat aaâcct 406

```

<210> 215

<211> 300

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> 66, 71, 259

<223> n = A,T,C or G

<400> 215

```

aggacatctg gaatgtcact ggtgcccagg tgtacttgag ctgtgaggtc atcggaatcc 60

```

```

cgacancgtgt nctcatctgg aacaaggtaa aaaggggtca ctatggagtt caaaggacag 120
aacttctgcc tggtgaccgg gacaacctgg ccattcagac ccgggggtggc ccagaaaagc 180
atgaagtaac tggctgggtg ctggtatctc ctctaagtaa ggaagatgct ggagaatatg 240
agtgccatgc atccaattnc caaggacagg cttcagcatc agcaaaaatt acagtgggtg 300

```

<210> 216

<211> 232

<212> DNA

<213> Homo sapiens

<400> 216

```

ttcaaaaagct tagagagaat aagcttcttg gtggtgaaat acaactctca cgtgtgctcc 60
agttctaaaa ttaacctgtg cctgggtctc gaagcccttt cttgctctgt gcctttcagc 120
cacatcctta ggtgctaacg gccatgagct ccgactctcc aaagtgagct ccactttggg 180
tctgaggagc ccctggcaga gtccacgctg cctcaggtat catgggcgta at 232

```

<210> 217

<211> 453

<212> DNA

<213> Homo sapiens

<400> 217

```

ataagcttct tgggtggtgaa actacaactc tcacgtgtgc tccagttcta aaattaacct 60
gtgcctggtc tctgaagccc tttcttgctc tgtgcctttc agccacatcc ttaggtgcta 120
acggccatga gctccgactc tccaaagtga gctccacttt ggtctgagg agcccctggc 180
agagtccacg ctgctcagg tatcatgggc gtaatgatca ccaggctcc gggagatctc 240
atggatgatt actgtatgag acagagggga cttcagctct tccagggcct tgggtggaatt 300
tttggctctg gtgttttcgc cagacaataa acttacactg gaagctttga ttcacctcc 360
acagtaactcc agaaaggact gtctataag ttgtacactt taaaaggcca tgtagaggtt 420
gtagtagaat ggcttttcac cctgggtgact ttg 453

```

<210> 218

<211> 520

<212> DNA

<213> Homo sapiens

<400> 218

```

agatgtgtga gaagtgtccc acctgtcccgg atgcatgcag caccaagaga gattgctgctg 60
agtgcctgct gctccactct gggaaacctg acaaccagac ctgccacagc ctatgcaggg 120
atgaggtgat cacatgggtg gacaccatcg tgaagatga ccaggaggct gtgctatgtt 180
tctacaaaac cgccaaggac tgcgtcatga tgttcaccta tgtggagctc cccagtggga 240
agtccaacct gaccgtctc agggagccag agtgtggaaa ccccccaac gccatgacca 300
tctctctggc tgtggtcggt agcctcctcc ttgttgggct tgcactcctg gctatctgga 360
agctgcttgt caccatccac gaccggaggg agtttgcaaa gtttcagagc gagcgatcca 420
gggcccgtga tgaatggct tcaaattctat tatacagaaa gcctatctcc acgcacactg 480
tggaacttcac cttcaacaag ttcaacaaat cctacaatgg 520

```

<210> 219

<211> 404

<212> DNA

<213> Homo sapiens

<400> 219

```

agatgtgtga gaagtgtccc acctgtcccgg atgcatgcag caccaagaga gattgctgctg 60
agtgcctgct gctccactct gggaaacctg acaaccagac ctgccacagc ctatgcaggg 120
atgaggtgat cacatgggtg gacaccatcg tgaagatga ccaggaggct gtgctatgtt 180
tctacaaaac cgccaaggac tgcgtcatga tgttcaccta tgtggagctc cccagtggga 240
agtccaacct gaccgtctc agggagccag agtgtggaaa ccccccaac gccatgacca 300
tctctctggc tgtggtcggt agcctcctcc ttgttgggct tgcactcctg gctatctgga 360
agctgcttgt caccatccac gaccggaggg agtttgcaaa gttt 404

```

<210> 220
 <211> 80
 <212> DNA
 <213> Homo sapiens

<400> 220
 atggcttcaa atccattata cagaaagcct atctccacgc acactgtgga cttcaccttc 60
 aacaagttca acaaatccta 80

<210> 221
 <211> 607
 <212> DNA
 <213> Homo sapiens

<400> 221
 tgccccacct gcccgatgc atgcagcacc aagagagatt gcgtcgagt cctgctgctc 60
 cactctggga aacctgacaa ccagacctgc cacagcctat gcagggatga ggtgatcaca 120
 tgggtggaca ccatcgtgaa agatgaccag gaggtctgtc tatgtttcta caaaaccgcc 180
 aaggactgcg tcatgatgtt cacctatgtg gagctcccca gtgggaagtc caacctgacc 240
 gtcctcaggg agccagagtg tggaaacacc cccaacgcca tgaccatcct cctggctgtg 300
 gtcggtagca tctccttgt tgggcttgca ctccctggcta tctggaagct gcttgtcacc 360
 atccacgacc ggagggagtt tgcaaagttt cagagcgagc gatccagggc ccgctatgaa 420
 atggcttcaa atccattata cagaaagcct atctccacgc acactgtgga cttcaccttc 480
 aacaagttca acaaatccta caatggcact gtggactgat gtttccttct ccgaggggct 540
 ggagcgggga tctgatgaaa aggtcagact gaaacgcctt gcacggctgc tcggcttgat 600
 cacaact 607

<210> 222
 <211> 583
 <212> DNA
 <213> Homo sapiens

<400> 222
 ggtatgtgcc atcacaagca gatgtggcag tatttgaagc cgtgtccagc ccaccgcctg 60
 ccgacttggtg tcatgcccta cgttggtata atcacatcaa gtcttacgaa aaggaaaagg 120
 ccagcctgcc aggagtgaag aaagctttgg gcaaatatgg tcttgccgat gtggaagaca 180
 ctacaggaag tggagctaca gatagtaaag atgatgatga cattgacctc tttggatctg 240
 atgatgagga ggaaagtga gaagcaaaga ggctaaggga agaacgtctt gcacaatatg 300
 aatcaaagaa agccaaaaaa cctgcacttg ttgccaagtc ttccatctta ctatgatgtga 360
 aaccttggga tgatgagaca gatatggcga aattagagga gtgcgtcaga agcattcaag 420
 cagacggctt agtctggggc tcatctaaac tagttccagt gggatacga attaagaaac 480
 ttcaaataca gtgtgtagtt gaagatgata aagttggaac agatatgctg gaggagcaga 540
 tcactgcttt tgaggactat gtgcagtcca tggatgtggc tgc 583

<210> 223
 <211> 296
 <212> DNA
 <213> Homo sapiens

<400> 223
 tacatcgagg ggtatgtgcc atcacaagca gatgtggcag tatttgaagc cgtgtccagc 60
 ccaccgcctg ccgacttggtg tcatgcccta cgttggtata atcacatcaa gtcttacgaa 120
 aaggaaaagg ccagcctgcc aggagtgaag aaagctttgg gcaaatatgg tcttgccgat 180
 gtggaagaca ctacaggaag tggagctaca gatagtaaag atgatgatga cattgacctc 240
 tttggatctg atgatgagga ggaaagtga aaagcaaaga ggctaaggga agaacg 296

<210> 224
 <211> 208
 <212> DNA
 <213> Homo sapiens

<220>

<221> misc_feature
<222> 97
<223> n = A,T,C or G

<400> 224
gactacatct tggacctgca gatcgccctg gactcgcatc ccactattgt cagcctgcat 60
caccagagac ccgggcagaa ccaggcgctc aggacgncgc tgaccaccct caacacggat 120
atcagcatcc tgtccttgca ggcttctgaa ttcccttctg agttaatgtc aaatgacagc 180
aaagcactgt gtggctgaat aagcgggtg 208

<210> 225
<211> 274
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> 133
<223> n = A,T,C or G

<400> 225
gcagcggctg gagcggcaga tcagccagga tgtcaagctg gagccagaca tcctgcttcg 60
ggccaagcaa gatttcctga agacggacag tgactcggac ctacagctct acaaggaaca 120
gggtgagggg canggtgacc ggagcctgcg ggagcgtgat gtgctggaac gggagtttca 180
gcgggtcacc atctctgggg aggagaagtg tggggtgccg ttcacagacc tgctggatgc 240
agccaagatg tgggtcgggc gtcttcatcc ggga 274

<210> 226
<211> 330
<212> DNA
<213> Homo sapiens

<400> 226
ggccgccctt tttttttttt tttttttttg ggcccagggg gggccccctt gggaaaaaca 60
cccgggaaac ttcccaaagg ggccttgggg gaattttttt taaaaaaaaa ctttttttta 120
aaaaaaaaactt tgggatttaa attttttttc cgccccctt tttgggcccgtgtaccccaat 180
ttaaaaaaagg ggggcttttt aaagggttggg aaaaaaaaaa aattgggggg gccccaaaaa 240
ttgggggggcc cccaaaaaaa aagcgggggtt tggaaaaatt ttgggggggt ttggaaattt 300
gggccccaaa acggggggacc cttttccccc 330

<210> 227
<211> 525
<212> DNA
<213> Homo sapiens

<400> 227
gaatttggcc ctcgaggcca agaattcggc acgaggggtc acatagcaat ttaatcaagt 60
aatgggttaat tagttacccc ctatatataa atatatgtaa tcaatttctt caaatagctt 120
gcttacatga taatcaatta gccaaccatg agtcatttag aatagtata aatagaatac 180
acagaatagt gatgaaattc aatttataaa atcacgttag cctccaaacc atttaattca 240
aatgaaccca tcaactggat gccaactctg gcgaatgtag gacctctgag tggctgtata 300
attgttaatt caaatgaaat tcattttaaac agttgacaaa ctgtcattca acaattagct 360
ccaggaaata acagttattt catcataaaa cagtccttcc aaacacacaa ttgttctgct 420
gaagagttgt catcaacaat ccaatgctca cctattcagt tgctctgtgg tcagtgtggc 480
tgcataacag tggattccat gaaaggagtc atttttagtga tgagc 525

<210> 228
<211> 788
<212> DNA
<213> Homo sapiens

<220>

<221> misc_feature
 <222> 42, 44, 48, 49, 51, 52, 53, 54, 55, 57, 59, 61, 62, 63, 64,
 68, 69, 70, 71, 73, 74, 75, 76, 77, 79, 80, 83, 87, 89,
 92, 93, 94, 95, 97, 98, 107, 112, 113, 117, 122, 125, 127,
 130, 131, 133, 671, 677, 685, 706, 713, 718, 725, 757, 771
 <223> n = A,T,C or G

<221> misc_feature
 <222> 783
 <223> n = A,T,C or G

<400> 228
 gttcacatag caattttaatc aagtaatcat taatttagggg gngngggngng nnnnnngngnt 60
 nnnngtgnnn ngnnnnngnn ggngtgngng tnnnnngngg gaggtgngga anngttnttt 120
 tntgngngan nantagaata cacagaatag tgatgaaatt caatttataaa aatcacgtta 180
 gcctccaaac cattttaattc aaatgaaccc atcaactgga tgccaactct ggcgaatgta 240
 ggacctctga gtggctgtat aattgttaat tcaaatgaaa ttcattttaa cagttgacaa 300
 actgtcattc aacaattagc tccaggaaat aacagttatt tcatcataaa acagtccctt 360
 caaacacaca attgttctgc tgaagagttg tcatcaacaa tccaatgctc acctattcag 420
 ttgctctgtg gtcagtgtgg ctgcataaca gtggattcca tgaaaggagt catttttagtg 480
 atgagctgcc agtccattcc caggccaggc gtgcgctggc catccattca gtcgattcag 540
 tcataggcga atctgttctg cccgaagctt gtggtcaagc aaaaattcag ccctgaaaat 600
 cagcacatct gttcgggtgga ctaaaccaca gttagtctgt caagcagcaa cccctgtggc 660
 atgaccgcca ntgggtncat gcgtntgcac tgggagttgg ccaaanctcc ggnggtcncg 720
 gggntttttt tgtgggtttt ttttttttag tcttgnnttt gggtaagtgg nttttttttt 780
 tcnttggg 788

<210> 229
 <211> 156
 <212> DNA
 <213> Homo sapiens

<400> 229
 gccgagggaa gggcccgga gctgaggagc cgctgagctt gctggacgac atgaaccact 60
 gctactcccg cctgcgggaa ctggtaccgc gagtcccag aggcactcag cttagccagg 120
 tggaaatcct acagcgcgtc atcgactaca ttctcg 156

<210> 230
 <211> 538
 <212> DNA
 <213> Homo sapiens

<400> 230
 tacgactcct atagggaatt tggccctcga ggccaagaat tcggcacgag ggtgactttg 60
 gctttgctcg catcatcggc gagaagtcgt tccgcccgtc agtggtgggc acgcccgcct 120
 acctggcacc cgaggtgctg ctcaaccagg gctacaaccg ctgcgtggac atgtggtcag 180
 tgggcgtgat catgtacgtc agcctcagcg gcaccttccc tttcaacgag gatgaggaca 240
 tcaatgacca gatccagaac gccgccttca tgtaccgggc cagcccctgg agccacatct 300
 cagctggagc cattgacctc atcaacaacc tgctgcaggt gaagatgcgc aaacgctaca 360
 gcgtggacaa atctctcagc cacccttggg tacaggagta ccagacgtgg ctggacctcc 420
 gagagctgga ggggaagatg ggagagcgat acatcacgca tgagagtgc gacgcgcgt 480
 gggagcagtt tgcagcagag catccgctgc ctgggtcttg gctgcccacg gacagggg 538

<210> 231
 <211> 232
 <212> DNA
 <213> Homo sapiens

<220>
 <221> misc_feature
 <222> 18, 56, 94, 103, 117, 128, 145, 184, 204, 219
 <223> n = A,T,C or G

<400> 231

```

tggttttgcg cgcatacncg gcgagaagtc gtcccgcgcg tcagtgggtg gcacgncggc 60
ctacctggca cccgaggtct tgctcaacca gggntacaac cgntcgctcg acatgtngtc 120
agtgggcntg atcatgtacg tcagncctcag cggcaccttc cctttcaacg aggatgagga 180
catnaatgac cagatccaga acgncgactt catgtaccng gccagaccct gg 232

```

<210> 232

<211> 420

<212> DNA

<213> Homo sapiens

<400> 232

```

taccggtccg gaattcccgg gtcgacccac gcggtccggcg tctctgctcc accaaggtgc 60
cctggacatg ctgaccaagg tgatggccct agagctcggg ccccaacaaga tccgagtga 120
tgacagtaaac cccacagtgg tgatgacgtc catgggccag gccacctgga gtgaccccca 180
caaggccaag actatgctga accgaatccc acttggaag tttgctgagg tagagcacgt 240
ggtagaacgc atcctctttc tgctgagtga ccgaagtggc atgaccacgg gttccacttt 300
gcccgtggaa gggggcttct gggcctgctg agctccctcc acacacctca agcccatgc 360
cgtgctcatc ctaccccca tccctccaat aaacctgatt ctgctgcca aaaaaaaaaa 420

```

<210> 233

<211> 294

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> 2, 170

<223> n = A,T,C or G

<400> 233

```

ngtgtactg ctccaccaag ggtgccctgg acatgctgac caaggtgatg gccctagagc 60
tcggggccca caagatccga gtgaatgcag taaacccac agtggtgatg acgtccatgg 120
gccaggccac ctggagtgc ccccaacaag ccaagactat gctgaaccgn atccacttg 180
gcaagtttgc tgaggtagag cacgtggtga acgccatcct ctttctgctg agtgaccgaa 240
gtggcatgac cacgggttcc actttgccgg tggaaagggg ttctggggct gctg 294

```

<210> 234

<211> 55

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> 42

<223> n = A,T,C or G

<400> 234

```

gtctcgggtcc atgactctgg agatccgaga aggaagaggc tntggcctga gaaag 55

```

<210> 235

<211> 394

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> 22, 335, 365, 377, 383, 391

<223> n = A,T,C or G

<400> 235

```

ttttttgttc atttatattt tntttaagag ctgtgcccag ttttatcatc tcacaagaat 60
gaagcaaggg acaaaggtaa gtgccacgct ccctggccac tgggttcctg gcaagctccc 120
agccactagg tgccaatctc ccttcaatgt actccttctt ccccagagtg cagaagcgta 180
tgaagacagt tatgacatgg acacatgcat gagctattat acataattac aaaagctgat 240
tctgtcatca ccacatcttg tctcatcagt aggagcgaat ggctggcggg acggtggcac 300
agtcagcctt gttcaaagtt ttgtcgatca cgggncctat attccagagt gacctttccc 360
agtgnccaac gttccanata ggncagggtc ntgc 394

```

<210> 236

<211> 468

<212> DNA

<213> Homo sapiens

<400> 236

```

agctcgggat tcggctcgag gacctggaaa ttccagggtg tgagctgcat cgaaggggag 60
cctgggcccc tcaggagcgt cctcttcaac ccagacggct gctgcctgta cagcggctgc 120
caggactcac tgcgtgtcta cggctgggaa cctgagcggg gctttgatgt ggtcctcgtc 180
aactggggca aggtggccga cctggccatc tgcaatgacc agttgatagg tgtggccttc 240
tcccagagca acgtctctc ctacgtggtg gatctgacgc gtgtcaccag gactggcacg 300
gtggccccgg accctgtgca ggaccaccgg cccctggcac agccactgcc caaccccagc 360
gccccctcc ggcgcatcta tgagcggccc agcacaacct gcagcaagcc tcagaggggtg 420
aagcagaact cagagagcga gcgccgcacc cccagcagcg aggatgac 468

```

<210> 237

<211> 254

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> 48, 85, 97

<223> n = A,T,C or G

<400> 237

```

gacctggaga agttccagggt ggtgagctgc atcgaagggg agcctgggcc cgtcaggagc 60
gtcctcttca acccagacgg ctgcngcctg tacagcngct gccaggactc actgcgtgtc 120
tacggctggg aacctgagcg gtgctttgat gtggctctcg tcaactgggg caaggtggcc 180
gacctggcca tctgcaatga ccagttgata ggtgtggcct tctcccagag caacgtctcc 240
tcctacgtgg tggg 254

```

<210> 238

<211> 419

<212> DNA

<213> Homo sapiens

<400> 238

```

gacccacgcg tccgtcttca acttctttag tctcctgag attcctatga ttgggaagct 60
ggaaccacga gaagatgcta tcttgatga ggactttgaa attgggcaga ttttacatga 120
taatgtcatc ctgaaatcaa tctattacta tactggagaa gtcaatggta cctactatca 180
at ttggcaaa cattatggaa acaagaaata cagaaaataa gtcaatctga aagatttttc 240
aagaatctta aaatctcaag aagtgaagca gattcatata gccttgaaaa aagtaaaacc 300
ctgacctgta acctgaacac tattattcct tatagtcagg tttttgtggt ttcttggtag 360
tctatatttt aaaaatagtc ctaaaaagtg tctaagtgcc agtttattct atctaggct 419

```

<210> 239

<211> 228

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> 190

<223> n = A,T,C or G

<400> 239

gaacccccgcc	cgcgggccaca	gcgtctgtctc	cacctccagc	ttgtacctgc	aggatctgag	60
cgccgcgcgc	tcagagtgc	tcgacccctc	ggtggtcttc	ccctaccctc	tcaacgacag	120
cagctcgccc	aagtcctgcg	cctcgcaaga	ctccagcgcc	ttctctccgt	cctcggattc	180
tctgcactcn	tcgacggagt	cctccccgca	gggcagcccc	gagcccct		228

<210> 240

<211> 525

<212> DNA

<213> Homo sapiens

<400> 240

aacccccgcc	gcggccacag	cgtctgtctc	acctccagct	tgtacctgca	ggatctgagc	60
gcgcgcgcgc	cagagtgc	cgacccctcg	gtggtcttc	cctaccctc	caacgacagc	120
agctcgccca	agtcctgcg	ctcgcaagac	tcacgcgcct	tctctccgtc	ctcggattct	180
ctgtctctct	cgacggagtc	ctccccgcag	ggcagccccg	agcccttggt	gctccatgag	240
gagacaccgc	ccaccaccag	cagcgactct	gaggaggaac	aagaagatga	ggaagaaatc	300
gatgttggtt	ctgtggaaaa	gaggcaggct	cctggcaaaa	ggtcagagtc	tggatcacct	360
tctgttgag	gccacagcaa	acctcctcac	agccactgg	tcctcaagag	gtgccacgtc	420
tccacacatc	agcacaacta	cgcagcgct	ccctccactc	ggaaggacta	tcctgctgcc	480
aagagggtca	agttggacag	tgtcagagtc	ctgagacaga	tcagc		525

<210> 241

<211> 552

<212> DNA

<213> Homo sapiens

<400> 241

tggaaggaac	tggtctgtctc	acacttgctg	gcttgcgcat	caggactggc	tttatctcct	60
gactcacggt	gcaaagggtgc	actctgcgaa	cgtaaagtc	gtcccagcgc	ttggaatcct	120
acggccccca	cagccggatc	ccctcagcct	tccaggtcct	caactcccgc	ggacgctgaa	180
caatggcctc	catggggcta	caggtaattg	gcctgcgcgt	ggccgtcctg	ggctggctgg	240
ccgtcatgct	gtgctgcgcg	ctgcccattg	ggcgctgac	ggccttcac	ggcagcaaca	300
ttgtcacctc	gcagaccatc	tgggagggcc	tatggatgaa	ctgcgtggtg	cagagcaccg	360
gccagatgca	gtgcaagggtg	tacgacttgc	tgttggaact	gccgcaggac	ctgcaggcgg	420
cccgcgcct	cgtcatcatc	agcatcatcg	tggctgctct	gggcgtgctg	ctgtccgtgg	480
tgggggggcaa	gtgtaccaac	tgcctggagg	atgaaagcgc	caaggccaag	accatgatcg	540
tggcgggcgt	gg					552

<210> 242

<211> 519

<212> DNA

<213> Homo sapiens

<400> 242

tggaaggaac	tggtctgtctc	acacttgctg	gcttgcgcat	caggactggc	tttatctcct	60
gactcacggt	gcaaagggtgc	actctgcgaa	cgtaaagtc	gtcccagcgc	ttggaatcct	120
acggccccca	cagccggatc	ccctcagcct	tccaggtcct	caactcccgc	ggacgctgaa	180
caatggcctc	catggggcta	caggtaattg	gcctgcgcgt	ggccgtcctg	ggctggctgg	240
ccgtcatgct	gtgctgcgcg	ctgcccattg	ggcgctgac	ggccttcac	ggcagcaaca	300
ttgtcacctc	gcagaccatc	tgggagggcc	tatggatgaa	ctgcgtggtg	cagagcaccg	360
gccagatgca	gtgcaagggtg	tacgacttgc	tgttggaact	gccgcaggac	ctgcaggcgg	420
cccgcgcct	cgtcatcatc	agcatcatcg	tggctgctct	gggcgtgctg	ctgtccgtgg	480
tgggggggcaa	gtgtaccaac	tgcctggagg	atgaaagcgc			519

<210> 243

<211> 296

<212> DNA

<213> Homo sapiens

<220> .
 <221> misc_feature
 <222> 64, 187, 195
 <223> n = A,T,C or G

<400> 243
 aggttcctca tctgctcgcg aggatgcctt ttctcttctg ccttgcgaaa taacagcagc 60
 ctanctgttg cccgtgacca gtgagaaagg cagcgtcacg ggctgattag gtttcaccca 120
 aagggtgccc gcgcggaatt ggtttctaac gagaactttt aaaatgatcc gttccaaaaa 180
 agggtangag ccgcnaagacc ctccaactgc ccagagaaaa caagtctcgt ctggcaaaaat 240
 tctcggccca cgcggtccgc ggccaagggg caaaggctct cgccccacgt tgccga 296

<210> 244
 <211> 273
 <212> DNA
 <213> Homo sapiens

<400> 244
 cttgcccatt gcgaattgtg gatgactgtg gtggggcctt tacgatgggt accattgggtg 60
 gtggtatctt tcaagcaatc aaagggttttc gcaattctcc agtgggagta aaccacagac 120
 tacgagggag ttgacagct attaaaacca gggctccaca gttaggagggt agctttgcag 180
 tttggggagg gctgttttcc atgattgact gtagtatggg tcaagtcaga ggaaaggaag 240
 atccctggaa ctccatcaca agtggtgcct taa 273

<210> 245
 <211> 386
 <212> DNA
 <213> Homo sapiens

<400> 245
 ttccgaattcg gcacgaggct cgatgtacgt cccggaggac ctccctcccg tctacaaaga 60
 aaaagtgggtg ccgcttgacg acattatcac gcccaccag tttgaggccg agttactgag 120
 tggccggaag atccacagcc aggaggaagc cttgcgggtg atggacatgc tgcactctat 180
 gggccccgac accgtggtca tcaccagctc cgacctgcc tccccgcagg gcagcaacta 240
 cctgattgtg ctggggagtc agaggaggag gaatcccgtg ggctccgtgg tgatggaacg 300
 catccggatg gacattcgca aagtggacgc cgtctttgtg ggcaactggg acctgtttgc 360
 tggcatgctc ctggcgtgga cacaca 386

<210> 246
 <211> 239
 <212> DNA
 <213> Homo sapiens

<400> 246
 tttttttttt caaaaaagtc atggaggcca tgggggtggc ttgaaaccag ctttgggggg 60
 ttcgattcct tccttttttg cctaaatttt atgtatacgg gttcttcaaa tgtgtggtag 120
 ggtggggggc atccatatag tcaactccagg tttatggagg gttcttctac tattaggact 180
 tttcgcttca aagcgaaggc ttctcaaata atgaaaatta ttaatattac tgctgttaa 239

<210> 247
 <211> 623
 <212> DNA
 <213> Homo sapiens

<400> 247
 aaaaagtcac ggaggccatg gggttggctt gaaaccagct ttgggggggt cgattccttc 60
 cttttttgtc tagattttat gtatacgggt tcttcgaatg tgtggtaggg tggggggcat 120
 ccatatagtc actccagggt tatggagggt tcttctacta ttaggacttt tcgcttcgaa 180
 gcgaaggctt ctcaaatcat gaaaattatt aatattactg ctggttagaga aatgaatgag 240
 cctacagatg ataggatgtt tcatgtggtg tatgcatcgg ggtagtccga gtaacgtcgg 300
 ggcattccgg ataggccgag aaagtgttgt gggaagaaag ttagatttac gccgatgaat 360

```

atgatagtga aatggatttt ggcgtagggt tggcttaggg tgtagcctga gaatagggga 420
aatcagtga tgaagcctcc tatgatggca aatacagctc ctattgatag gacatagtgg 480
aagtgagcta caacgtagta cgtgtcgtgt agtacgatgt ctagtgatga gtttgcta 540
acaatgccag tcaggccacc tacgggtgaaa agaaagatga atcctagggc tcagagcact 600
gcagcagatc atttcatatt gct 623

```

<210> 248

<211> 265

<212> DNA

<213> Homo sapiens

<400> 248

```

ggcttagcgg ataacaattt cacacaggag ttgcaccata atcatcgcta tccccaccgg 60
cgtcaaagta tttagctgac tcgccacact ccacggaagc aatatgaaat gatctgctgc 120
agtgtcttga gccctaggat tcatctttct tttcaccgta ggtggcctga ctggcattgt 180
attagcaaac tcatcactag acatcgtact acacgacacg tactacgttg tagctcactt 240
ccactatgtc ctatcaatag gagct 265

```

<210> 249

<211> 625

<212> DNA

<213> Homo sapiens

<400> 249

```

aatcatcgct atccccaccg gcgtcaaagt atttagctga ctgccacac tccacggaag 60
caatatgaaa tgatctgctg cagtgtctct agccctagga ttcattcttc ttttcaccgt 120
aggtggcctg actggcattg tattagcaaa ctcatcacta gacatcgtae tacacgacac 180
gtactacgtt gtactcact tccactatgt cctatcaata ggagctgtat ttgccatcat 240
aggaggcttc attcactgat tccccctatt ctgaggctac accctagacc aaacctacgc 300
caaaatccat ttcactatca tattcatcgg cgtaaatacta actttcttcc cacaacactt 360
tctcggccta tccggaatgc cccgacgtta ctcggtactac cccgatgcac acaccacatg 420
aaacatccta tcatctgtag gctcattcat ttctctaaca gcagtaatat taataatttt 480
catgatttga gaagccttcg cttcgaagcg aaaagtccta atagtagaag aacctcccat 540
aaacctggag tgactatatg gatgcccccc accctaccac acattcgaag aacctcgata 600
cataaaatct agacaaaaaa ggaag 625

```

<210> 250

<211> 253

<212> DNA

<213> Homo sapiens

<400> 250

```

ggcttgtaat acgactcact atagggtttt ttttttttca aaaaagtcac ggaggccatg 60
gggttggttt gaaaccagct ttggggggtt cgattccttc cttttttgtc taaattttat 120
gtatacgggt tcttcaaagt tgtggtaggg tggggggcat ccatatagtc actccagggt 180
tatggagggt tcttctacta ttaggacttt tcgcttcaaa gcgaaggctt ctcaaatacat 240
gaaaattatt aat 253

```

<210> 251

<211> 290

<212> DNA

<213> Homo sapiens

<400> 251

```

caaactcatc actagacatc gtactacacg acacgtacta cgttgtagct cacttccact 60
atgtcctatc aataggagct gtatttgcca tcataggagg cgtcattcac tgatttcccc 120
tattctcagg ctacacccta gaccaaact acgcaaaaat ccatttctact atcatattca 180
tcggcgtaaa tctaactttc tccccacaac actttctcgg cctatccgga atgccccgac 240
gttattcgga ctaccccgat gcatacacca catgaaacat cctatcatct 290

```

<210> 252

<211> 638

<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> 522, 634, 636
<223> n = A,T,C or G

<400> 252
atatttacag taggaataga cgtagacaca cgagcatatt tcacctccgc taccataatc 60
atcgctatcc ccaccggcgt caaagtattt agctgactcg ccacactcca cggaagcaat 120
atgaaatgat ctgctgcagt gctctgagcc ctaggattca tctttctttt caccgtaggt 180
ggcctgactg gcattgtatt agcaaactca tcactagaca tcgtactaca cgacacgtac 240
tacgttgtag ctcacttcca ctatgtccta tcaataggag ctgtatttgc catcatagga 300
ggcttcattc actgatttcc cctatttctca ggctacaccc tagaccaaac ctacgccaac 360
atccatttca ctatcatatt catcggcgta aatctaactt tcttcccaca acactttctc 420
ggcctatccg gaatgccccg acgttattcg gactaccccg atgcatacac cacatgaaac 480
atcctatcat ctgtaggctc attcatttct ctaacagcag tnatattaat aattttcatg 540
atttgagaag ccttcgcttc gaagcgaaaa gtccataatag tagaagaacc cttcataaac 600
ctggagtgc tatatggatg cccccaccc tacnanca 638

<210> 253
<211> 531
<212> DNA
<213> Homo sapiens

<400> 253
ggcttagcgg ataacaattt cacacaggag ttgcaccata tatttacagt aggaatagac 60
gtagacacac gagcatattt cacctccgct accataatca tcgctatccc caccggcgctc 120
aaagtattta gctgactcgc cacactccac ggaagcaata tgaaatgatc tgctgcagtg 180
ctctgagccc taggattcat ctttcttttc accgtaggtg gctgactgg cattgtatta 240
gcaaactcat cactagacat cgtactacac gacacgtact acgttgtagc tcacttccac 300
tatgtcctat caataggagc tgtatttggc atcataggag gcttcattca ctgatttccc 360
ctatttctcag gctacaccc t agaccaaacc tacgccaata tccatttcac tatcatattc 420
atcggcgtaa atctaactt cttcccacaa cactttctcg gcctatccg aatgccccga 480
cgttactcgg actaccccga tgcatacacc acatgaaaca tcctatcatc t 531

<210> 254
<211> 625
<212> DNA
<213> Homo sapiens

<400> 254
atatttacag taggaataga cgtagacaca cgagcatatt tcacctccgc taccataatc 60
atcgctatcc ccaccggcgt caaagtattt agctgactcg ccacactcca cggaagcaat 120
atgaaatgat ctgctgcagt gctctgagcc ctaggattca tctttctttt caccgtaggt 180
ggcctgactg gcattgtatt agcaaactca tcactagaca tcgtactaca cgacacgtac 240
tacgttgtag ctcacttcca ctatgtccta tcaataggag ctgtatttgc catcatagga 300
ggcttcattc actgatttcc cctatttctca ggctacaccc tagaccaaac ctacgccaac 360
atccatttca ctatcatatt catcggcgta aatctaactt tcttcccaca acactttctc 420
ggcctatccg gaatgccccg acgttactcg gactaccccg atgcatacac cacatgaaac 480
atcctatcat ctgtaggctc attcatttct ctaacagcag taatattaat aattttcatg 540
atttgagaag tcttcgcttc gaagcgaaaa gtccataatag tagaagaacc cttcataaac 600
ctggagtgc tatatggatg ccccc 625

<210> 255
<211> 217
<212> DNA
<213> Homo sapiens

<400> 255
tttttttttt taaaaagtca tggaggccat ggggttggt tgaaaccacc tttggggggt 60

```
tcaatccctt ccttctttgt ctaaatttta tgtatacggg ttcttcaaat gtgtggtagg 120
gggggggggca tccatatagc ccctccaggt ttatggaggg ttcttctact attagaactt 180
ttcccttcaa agcaaaggct tctcaaatca tgaaaat 217
```

```
<210> 256
<211> 636
<212> DNA
<213> Homo sapiens
```

```
<220>
<221> misc_feature
<222> 496, 562, 564, 605, 635
<223> n = A,T,C or G
```

```
<400> 256
aaagtcattgg aggccatggg gttggcttga aaccagcttt ggggggttcg attccttcct 60
tctttgtcta gattttatgt atacgggttc ttccaatgtg tggtaggggtg gggggcatcc 120
atagatgcac tccagggtta tggagggttc ttctactatt aggacttttc gcttcgaagc 180
gaaggcttct caaatcatga aaattattaa tattactgct gttagagaaa tgaatgagcc 240
tacagatgat aggatgtttc atgtgggtga tgcacgggg tagtccgagt aacgtcgggg 300
cattccggat aggccgagaa agtgttgggt gaagaaagt agatttacgc cgatgaatat 360
gatagtgaat tggatttttg cgtagggttg gtctagggtg tagcctgaga ataggggaaa 420
tcagtgaatg aagcctccta tgatggcaaa tacagctcct attgatagga catagtggaa 480
gtgagctaca acgtantacg tgcgtgttag tacgatgtct agtgatgagt ttgctaatac 540
aatgccagtc aggccaccta cngngaaaaa gaaagatgaa tcctagggtc caaaacacct 600
gcacnagatc atttcatatt ggcttcctg gagtnc 636
```

```
<210> 257
<211> 279
<212> DNA
<213> Homo sapiens
```

```
<400> 257
ggcttagcgg ataacaattt cacacaggag ttgcaccata atcatcgcta tccccaccgg 60
cgtcaaagta tttagctgac tcgccacact ccacgaagc aatatgaaat gatctgctgc 120
agtgtctga gccctaggat tcatctttct ttccaccgta ggtggcctga ctggcattgt 180
attagcaaac tcatcactag acatcgtaac acacgacacg tactacgttg tagctcactt 240
ccactatgtc ctatcaatag gagctgtatt tgccatcat 279
```

```
<210> 258
<211> 623
<212> DNA
<213> Homo sapiens
```

```
<220>
<221> misc_feature
<222> 537
<223> n = A,T,C or G
```

```
<400> 258
aatcatcgct atccccaccg gcgtcaaagt atttagctga ctgcgcacac tccacggaag 60
caatatgaaa tgatctgctg cagtgtctct agccctagga ttcatctttc ttttcaccgt 120
aggtagcctg actggcattg tattagcaaa ctcatcacta gacatcgtae tacacgacac 180
gtactacgtt gtactcact tccactatgt cctatcaata ggagctgtat ttgccatcat 240
aggaggcttc attcactgat ttcccctatt ctacggctac accctagacc aaacctacgc 300
caaaatccat ttactatca tattcatcgg cgtaaatcta actttcttcc cacaacactt 360
tctcggccta tccggaatgc cccgacgtta ctcggtactac cccgatgcac acaccacatg 420
aaacatccta tcatctgtag gctcattcat ttctctaaca gcagtaatat taataatttt 480
catgatttga gaagccttcg cttcgaagcg aaaagtccta atagtagaag aaccctncat 540
aaacctggag tgactatatg gatgcccccc accctaccac acattcgaag aaccctgata 600
cataaaatct agacaaaaaa gga 623
```

<210> 259
 <211> 189
 <212> DNA
 <213> Homo sapiens

<220>
 <221> misc_feature
 <222> 170; 173
 <223> n = A,T,C or G

<400> 259
 tggcctttcc cccttcatgg gagacaacga taacgaaacc ttggccaacg ttacctcagc 60
 cacctgggac ttcgacgacg aggcattcga tgagatctcc gacgatgcc aaggatttcat 120
 cagcaatctg ctgaagaaag atatgaaaaa ccgcctggac tgcacgcagn ctntcagcat 180
 ccatggcta 189

<210> 260
 <211> 507
 <212> DNA
 <213> Homo sapiens

<400> 260
 cctttccccc ttcattgggag acaacgataa cgaaaccttg gccaacgtta cctcagccac 60
 ctgggacttc gacgacgagg cattcgatga gatctccgac gatgccaagg atttcatcag 120
 caatctgctg aagaaagata tgaaaaaccg cctggactgc acgcagtgcc ttcagcatcc 180
 atggctaata aaagatacca agaacatgga ggccaagaaa ctctccaagg accggatgaa 240
 gaagtacatg gcaagaagga aatggcagaa aacgggcaat gctgtgagag ccattggaag 300
 actgtcctct atggcaatga tctcagggtc cagtggcagg aaatcctcaa cagggtcacc 360
 aaccagcccg ctcaatgcag aaaaactaga atctgaagaa gatgtgtccc aagctttcct 420
 tgaggctgtt gctgaggaaa agcctcatgt aaaaccctat ttctctaaga ccattcgcga 480
 tttagaagtt gtggaggga gtgctgc 507

<210> 261
 <211> 193
 <212> DNA
 <213> Homo sapiens

<400> 261
 tttttttttt tttttttttt ttttttggcc gagactccaa gactattatt tttatttccg 60
 gacaaaaaca tctgcttcac acagtgcacg gcatcaaag aagaggaaa aacttgtatc 120
 ccaaagcctg gctttctgta tcatccacaa attaagacag catctgctga gcccatgctg 180
 agcctgtcac agt 193

<210> 262
 <211> 235
 <212> DNA
 <213> Homo sapiens

<220>
 <221> misc_feature
 <222> 183, 184, 185, 193
 <223> n = A,T,C or G

<400> 262
 ccactttccc caggagcagg ccacagaccc ccttgtggac agcctgggca gtggcattgt 60
 ctactcagcc cttacctgcc acctgtgcgg ccacctgaaa cagtgtcatg gccaggagga 120
 tgggtggccag acccctgtca tggccagtcc ttgctgtggc tgctgtgtg gagacaggtc 180
 ctnnnccctt acnaccctcc tgaggggccc agaccctctt ccagggtggg ttcca 235

<210> 263
 <211> 493
 <212> DNA

<213> Homo sapiens

<400> 263

```

agaatttcag cagttctctg atttttatat tttattcctc ttcctatcca atccctgcct 60
tttgagtcca ggtggtaagt acattttctt taacgttttt cctgcttttc ttcccaaatg 120
tgtctttttc tttgggctac tgtaccctgc ttccagtgcg gtccccggca taggtccatc 180
tctgcagaag ccatttcagg agtacctgga ggctcaacgg cagaagcttc accacaaaag 240
cgaaatgggc acaccacagg gagaaaactg cttgtcctgg atgtttgaaa agtcggtcga 300
tgtcatggcg tgttacttca tcctatctat cattaactcc atggcacaaa gttatgcaa 360
acgaatccag cagcggttga actcagagga gaaaactaaa taagtagaga aagttttaa 420
ctgcagaaat tggagtggat gggttctgcc ttatattggg aggactcaa gccgggaagg 480
aaaattccct ttt                                     493

```

<210> 264

<211> 345

<212> DNA

<213> Homo sapiens

<400> 264

```

agaatttcag cagttctctg atttttatat tttattcctc ttcctatcca atccctgcct 60
tttgagtcca ggtggtaagt acattttctt taacgttttt cctgcttttc ttcccaaatg 120
tgtctttttc tttgggctac tgtaccctgc ttccagtgcg gtccccggca taggtccatc 180
tctgcagaag ccatttcagg agtacctgga ggctcaacgg cagaagcttc accacaaaag 240
cgaaatgggc acaccacagg gagaaaactg gttgtcctgg atgtttgaaa agtcggtcgt 300
tgtcatggcg tgttacttca tcctatctat cattaactcc atggt                                     345

```

<210> 265

<211> 374

<212> DNA

<213> Homo sapiens

<400> 265

```

tagaagagct aacctcacac tcatcccaact ctaaactatg tgattcaaca ctgattttac 60
atccaacaaa gtgaaatctt gatagttggg tgtaaaaagg agagtaatgg agatttcaga 120
gtagttgggg ttgcttactt ttcattttta attctttagg ttttgtaagt tacacacttc 180
aagcattata gatgacctc tttttactac tgaactaatg aagccttttt cattgcattg 240
ttctgcattt atttctacag ggagaaaact ggttgctcctg gatgtttgaa aagttggctg 300
ttgtcatggg gtgttacttc atcctatcta tcattaactc catggcacaa agttatgcca 360
aacgaatcca gcag                                     374

```

<210> 266

<211> 360

<212> DNA

<213> Homo sapiens

<400> 266

```

tttttttttt tttttttttg tgcggtggga attctctaata tgtatcatgt gggccttttg 60
aaagtaacaa acagaaggcc agtctgctgc aagtttgctg ctgaacatca cattccaccc 120
taagaaaaca caaggtggat tgcacgagg gtggatacct taccttagca cggaaggaaa 180
aagtatgtca gtgcaaagta tggactaaac tgctttcagg aaaaaagttg taaaaattga 240
tacaggttgg aaaagggaat tttccttccc ggcttgagg cctcccaatt taaggcagaa 300
cccatccact ccaatttctg cagtttaaaa ctttctctac ttatttagtt ttctcctctg 360

```

<210> 267

<211> 247

<212> DNA

<213> Homo sapiens

<400> 267

```

ctggaattgt catcttttga acagtgattg caacagcact tatgggattg acagagaaac 60
tgattttttc cctgagagat cctgcataca gtacattccc gccagaagggt gttttcgtaa 120

```

```

atagcgttgg ccttctgac ctggtgttcg gggccctcat tttttggata gtcaccagac 180
cgcaatggaa acgtcctaag gagccaaatt ctaccattct tcatccaaat ggaggcatga 240
acaggga                                           247

```

<210> 268

<211> 350

<212> DNA

<213> Homo sapiens

<400> 268

```

taatggattt gtttggagat ggcattgttg tagacgactg aatatggaaa ggatatcaag 60
ttatctattt tgttaatttt atttttgttt tttatcatct agatttttat catggattag 120
tctgaaattt aaagtctctg ccagtcgggt ttctttcatc ttgtagtttt tacagtattt 180
ccactgtgca tatgcaaaat gggatttaca taactgtatc atatttggtt ttgataattt 240
tttttttttt ttggaaacgg gtttttgttt tggcccagcc caaaaacatc ccttggttac 300
cccttccggg gaaaaaaaaa caaacccctt tttcggggaa aaaaaaaggg 350

```

<210> 269

<211> 455

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> 81, 195, 231, 247, 298, 307, 317, 395, 427, 446, 451

<223> n = A,T,C or G

<400> 269

```

ttttttttta atcaaagagt agtttattaa aaaaggaatc aaacaggaaa ctctaagtac 60
cagtgtgtac attgtacaat nttaaagac tcacgagaat gaagtttttt tcaaatatat 120
taagatcaca ccaccttggt gtttatcgaa agatattcaa ggagaaagat ctgactctcc 180
aaactgcatc tgagnattgc cactttaaac aggacctcat ttcaaacatg ncaacaacgc 240
cactggntaa taaaggcttt gggaatgggg tgctcattct attatttcac taaaaacngc 300
atagganagg caggagnagt tggggaattt attctaaaat aggaatggga gggttgtcca 360
tctacagcag gcactccttc acttcctctg tttgnccttt ttaggcagta ctcccttggtc 420
ggtcttngaa cggttttcca accctnttca ntggg                                           455

```

<210> 270

<211> 444

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> 17, 20, 391, 430

<223> n = A,T,C or G

<400> 270

```

ttttctgacg tctgttncn aggctggaag aaatgagcag aaaacaaggg atgagtactt 60
tttagagtat gtgcatgta cgtaatacct gtttctgggc aatgctgctt cttctgactc 120
aacaaatggg gagagcaaat tgaaaatgcg taaattggaa ggcaagttct gaaattaaac 180
gttgtacttt ggcctgatgt tctgaccttt aaggaagcaa gagtttgtaa acttccaaat 240
atttactatt ctgaactgcc gtgtaaacct gacgtattcc caagtcaaca taccagtata 300
ccaataggat gtgaataatg tttgtgttga gtttaaaacc atagcagttt tgctctggca 360
agtaatggaa agcgttctcg cttcctgagt ntgagctcca gcagactgca gaggggccag 420
tgccacagtn gtagcctgac tttc                                           444

```

<210> 271

<211> 502

<212> DNA

<213> Homo sapiens

<400> 271

```

ggttctgcgc tggtcggcgg agtagcaagt ggccatgggg agcctcagcg gtctgcgcct 60
ggcagcagga agctgtttta ggttatgtga aagagatggt tcctcatctc taaggcttac 120
cagaagctct gatttgaaga gaataaatgg attttgaca aaaccacagg aaagtcccgg 180
agctccatcc cgcacttaca acagagtggc ttacacaaa cctacggatt ggcagaaaaa 240
gatcctcata tggtcaggtc gcttcaaaaa ggaaggtgaa atcccagaga ctgtctcggt 300
ggagatgctt gatgctgcaa agaacaagat gcgagtgaag atcagctatc taatgattgc 360
cctgacgggtg gtaggatgca tcttcatggt tattgagggc aagaaggctg cccaaagaca 420
cgagacttta acaagcttga acttagaaaa gaaagctcgt ctgaaagagg aagcagctat 480
gaaggccaaa acagagtagc ag                                     502

```

<210> 272

<211> 377

<212> DNA

<213> Homo sapiens

<400> 272

```

ggttctgcgc tggtcggcgg agtagcaagt ggccatgggg agcctcagcg gtctgcgcct 60
ggcagcagga agctgtttta ggttatgtga aagagatggt tcctcatctc taaggcttac 120
cagaagctct gatttgaaga gaataaatgg attttgaca aaaccacagg aaagtcccgg 180
agctccatcc cgcacttaca acagagtggc ttacacaaa cctacggatt ggcagaaaaa 240
gatcctcata tggtcaggtc gcttcaaaaa ggaaggtgaa atcccagaga ctgtctcggt 300
ggagatgctt gatgctgcaa agaacaagat gcgagtgaag atcagctatc taatgattgc 360
cctgacgggtg gtaggaa                                     377

```

<210> 273

<211> 552

<212> DNA

<213> Homo sapiens

<400> 273

```

agctcggaat tgggctcgag tctgctcagc ctggtgaacc cacaggcccc agtttcaccc 60
agtccccact ccacggtgca gctgcggctt atctctcagc ccagcgagat gccagccttc 120
ctgtcccggg ccagcgctct gacatgcaga aggtgacctt gggcctgctt gtgttctctg 180
caggctttcc tgtcctggac gccaatgacc tagaagataa aaacagtcct ttctactatg 240
actggcacag cctccagggt ggcgggctca tctgcgctgg ggttctgtgc gccatgggca 300
tcatcatcgt catgagtgca aaatgcaa atgcaagtttg ccagaagtcc ggtcaccatc 360
caggggagac tccacctctc atcaccccag gctcagccca aagctgatga ggacagacca 420
gctgaaattg ggtggaggac cgttctctgt cccaggtcc tgtctctgca cagaaacttg 480
aactccagga tgggaattct cctcctctgc tgggactcct ttgcatggca gggcctcatc 540
tcacctctcg ca                                     552

```

<210> 274

<211> 186

<212> DNA

<213> Homo sapiens

<400> 274

```

ctgctcagcc tgggtgaacac acagcccgat ttaccacagtc cccactccag gtgcagctgc 60
ggcttatctc tcagcccagc gagatgccag ccttctctgt cggggccagc gctctgacat 120
gcagaagggtg accctgggccc tgcttgtgtt cctggcaggc tttcctgtcc tggacgccaa 180
tgacct                                     186

```

<210> 275

<211> 121

<212> DNA

<213> Homo sapiens

<400> 275

```

tctgctcagc ctggtgaacc acacaggccc gagtttcacc cagtccccac tccacgggtgc 60
agctgcggct tatctctcag cccagcgaga tgccagcctt cctgtcccgg gccagcgtc 120
t                                     121

```


<210> 276
 <211> 336
 <212> DNA
 <213> Homo sapiens

<220>
 <221> misc_feature
 <222> 336
 <223> n = A,T,C or G

<400> 276
 agggacccgc agctcagcta cagcacagat cagcaccatg aagcttctca cgggcctggt 60
 tttctgctcc ttggtcctga gtgtcagcag ccgaagcttc ttttcgttcc ttggcgaggc 120
 ttttgatggg gctcgggaca tgtggagagc ctactctgac atgagagaag ccaattacat 180
 cggctcagac aaatacttcc atgtctgggg gaactatgat gctgccaaaa ggggacctgg 240
 ggggtgcctgg gccgcagaag tgatcagcaa tgccagagag aatatccaga gactcacagg 300
 ccatggtgcg gaggactcgc tggccgatca ggctgn 336

<210> 277
 <211> 460
 <212> DNA
 <213> Homo sapiens

<400> 277
 tgcagacgga ggtcaggtct tcctctttcc tgagactgga tctgttcaaa cagcaaacgc 60
 ccacagatgg cccagaggtg gtggtagtca ggggtgtggt gtgttttttag ggttcttttag 120
 tgttgtttct ttcaccaggg ggtggtggtc ccagccagtt tgggtgctgac ggtgagagga 180
 aattagaatc tgtttgcaaa ttgtccaacc caccctctca acatgagggg cttccatttt 240
 ctgtgttttg taagggaact gtttccttca tgccgccatg ttcctgatat tagttctgat 300
 ttcttttttaa caaatgttat catgattaag aaaatttcca gcactttaat ggccaattaa 360
 ctgagaatgt aagaaaattg atgctgtaca aggcaaataa agctgtttat taaccttgaa 420
 aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa ttttttgggg 460

<210> 278
 <211> 432
 <212> DNA
 <213> Homo sapiens

<220>
 <221> misc_feature
 <222> 46, 151, 350, 362, 383, 403, 417
 <223> n = A,T,C or G

<400> 278
 ggggttgtag acggaggtca ggtcttcttc tttcttgaga ctgganctgt tcaaacagca 60
 aacgcccaca gatggcccag aggtggtggt agtcagggtg tgtgggtggt tttagggttc 120
 tttagtgttg tttctttcac ccaggggtgg ntgggtccag ccagtttggt gctgacgggtg 180
 agaggaaatt agaactctgt tgcaaatgtt ccaaccacc ccoctcaacat gaggggcttc 240
 cattttctgt gttttgtaag ggaactgtt ccttcatgcc gccatgttcc tgatattagt 300
 tctgatttct ttttaacaaa tgttatcatg attaaagaaa tttccagcan ttaatgggcc 360
 anttaactga gaatgtaaga aantgatgct gttacaaggc aantaaagcc gttttantta 420
 accctgaaaa aa 432

<210> 279
 <211> 467
 <212> DNA
 <213> Homo sapiens

<400> 279
 acgtgacgcg gggccaggcg gccgtacagc agctgcaggc ggagggcctg agcccgcgct 60
 tccaccagct ggacatcgac gatctgcaga gcatccgcgc cctgcgcgac ttcctgcgca 120

```

aggagtacgg gggcctggac gtgctggtca acaacacggg catcgcccttc aaggttgctg 180
atccccacacc ctttcatatt caagctgaag tgacgatgaa aacaaatttc tctggtaccc 240
gagatgtgtg cacagaatta ctccctctaa taaaacccca agggagagtg gtgaacgtac 300
ctagcatcat gagcgtcaga gcccttaaaa gctgcagccc agagctgcag cagaagttcc 360
gcagtgaagc catcactgag gaggaggtg tggggctcat gaacaagttt gtggaggata 420
caaagaaggg agtgcaccag aaggagggtt ggcccagcag cgcatac 467

```

<210> 280

<211> 626

<212> DNA

<213> Homo sapiens

<400> 280

```

tacggccggg acgtgacgag gggccaggcg gccgtacagc agctgcaggc ggagggcctg 60
agcccgcgct tccaccagct ggacatcgac gatctgcaga gcatccgcgc cctgcgcgac 120
ttcctgcgca aggagtacgg gggcctggac gtgctggtca acaacacggg catcgccctc 180
aaggttgctg atccccacacc ctttcatatt caagctgaag tgacgatgaa aacaaatttc 240
tctggtaccc gagatgtgtg cacagaatta ctccctctaa taaaacccca agggagagtg 300
gtgaacgtac ctagcatcat gagcgtcaga gcccttaaaa gctgcagccc agagctgcag 360
cagaagttcc gcagtgaagc catcactgag gaggaggtg tggggctcat gaacaagttt 420
gtggaggata caaagaaggg agtgcaccag aaggagggtt ggcccagcag cgcatacggg 480
gtgacgaaga ttggcgtcac cgttctgtcc aggatccacg ccaggaaact gagtgaagcag 540
aggaaagggg acaagatcct cctgaatgcc tgctgcccgag ggtgggtgag aactgacatg 600
gcgggaccca aggccaccaaa gagccc 626

```

<210> 281

<211> 487

<212> DNA

<213> Homo sapiens

<400> 281

```

tggcctgttc ctcagcgagg gcctgaagct agtggataag tttttggagg atgttaaaaa 60
gttgtaccac tcagaagcct tcaactgtcaa cttcggggag accgaagagg ccaagaaaca 120
gatcaacgat tacgtggaga agggactca agggaaaatt gtggatttgg tcaaggagct 180
tgacagagac acagtttttg ccctggtgaa ttacatcttc tttaaaggca aatgggagag 240
accctttgaa gtcaaggaca ccgaggaaga ggacttccac gtggaccagg cgaccaccgt 300
gaaggtgcct atgatgaagc gtttaggcat gtttaacatc cagcactgta agaagctgtc 360
cagctgggtg ctgctgatga aatacctggg caatgccacc gccatcttct tcctgcctga 420
tgaggggaaa ctacagcacc tggaaaatga actcaccac gatatcatca ccaagttcct 480
ggaaaaat 487

```

<210> 282

<211> 345

<212> DNA

<213> Homo sapiens

<400> 282

```

tggcctgttc ctcagcgagg gcctgaagct agtggataag tttttggagg atgttaaaaa 60
gttgtaccac tcagaagcct tcaactgtcaa cttcggggag accgaagagg ccaagaaaca 120
gatcaacgat tacgtggaga agggactca agggaaaatt gtggatttgg tcaaggagct 180
tgacagagac acagtttttg ccctggtgaa ttacatcttc tttaaaggca aatgggagag 240
accctttgaa gtcaaggaca ccgaggaaga ggacttccac gtggaccagg cgaccaccgt 300
gaaggtgcct atgatgaagc gtttaggcat gtttaacatc cagca 345

```

<210> 283

<211> 495

<212> DNA

<213> Homo sapiens

<400> 283

```

cgccgcgcct tttttttttt tttttttttt tttttttttt tttttttttt tttttttttt 60
tttttttttc aaaaaaaaaa ttttttgggt tttttttttt aaaacttttt tttttttttt 120

```

```

ttttgggggg ggccaaattc ccccccaaaa aaaaaaaaaa aggggggggg ttcccccccc 180
cccccttttt tttttggggg ggtttttttt tttggggggg gcccccccc cttttttttt 240
tttttgaaaa aaaatcccc ctttgggggg ggtttctttt tcccaaagg agtttttttt 300
cccccccccc cggggggggg ggggggtttt ttttttttta aaaaaaaaaa ccccggaaaa 360
aaaaaaaaac ccccccccc ccccccccc aaaaaaaaaa aaggggggaa aaatgggggc 420
ccccctttt ttttttttt ttttttggg gggggggaaa aaaaaccccc cccccctttt 480
tggggggggt ttttt 495

```

<210> 284

<211> 503

<212> DNA

<213> Homo sapiens

<400> 284

```

attccgttgc tgtcagcat gaccaagcag ctgggtgact tctggacacg gatggaggag 60
ctccgccacc aagcccgga gcagggggca gaggcagtc aggccagca gcttgcgaa 120
ggtgccagcg agcaggcatt gagtgccaa gaggatttg agagaataaa acaaaagtat 180
gctgagttga aggaccggtt gggtcagagt tccatgctgg gtgagcagg tgcccgatc 240
cagagtgtga agacagaggc agaggagctg tttggggaga ccatggagat gatggacag 300
atgaaagaca tggagttgga gctgctgcgg ggcagccagg ccatcatgct gcgctcagc 360
gacctgacag gactggagaa gcgtgtggag cagatccgtg accacatcaa tgggcgcgtg 420
ctctactatg ccacctgcaa gtgatgtac agcttccagc ccgttgcccc actcatctgc 480
cgcttttgc tttggttgg ggc 503

```

<210> 285

<211> 581

<212> DNA

<213> Homo sapiens

<400> 285

```

agtggcactg caggaagctc aggacaccat gcaaggcacc agccgctccc ttcggcttat 60
ccaggacagg gttgctgagg ttcagcaggt actgcggcca gcagaaaagc tggtgacaag 120
catgaccaag cagctgggtg acttctggac acggatggag gagctccgcc accaagccc 180
gcagcagggg gcagaggcag tccaggccca gcagcttgcg gaaggtgcca gcgagcaggc 240
attgagtgcc caagagggat ttgagagaat aaaacaaaag tatgctgagt tgaaggaccg 300
gttgggtcag agttccatgc tgggtgagca ggggtgcccg atccagagt tgaagacaga 360
ggcagaggag ctgtttgggg agaccatgga gatgatggac aggatgaaag acatggagtt 420
ggagctgctg cggggcagcc aggccatcat gctgcgctca gcggacctga caggactgga 480
gaagcgtgtg gagcagatcc gtgaccacat caatgggcgc gtgctctact atgccacctg 540
caagtgatgc tacagcttcc agcccgttgc cccactcatc t 581

```

<210> 286

<211> 598

<212> DNA

<213> Homo sapiens

<400> 286

```

agtggcactg caggaagctc aggacaccat gcaaggcacc agccgctccc ttcggcttat 60
ccaggacagg gttgctgagg ttcagcaggt actgcggcca gcagaaaagc tggtgacaag 120
catgaccaag cagctgggtg acttctggac acggatggag gagctccgcc accaagccc 180
gcagcagggg gcagaggcag tccaggccca gcagcttgcg gaaggtgcca gcgagcaggc 240
attgagtgcc caagagggat ttgagagaat aaaacaaaag tatgctgagt tgaaggaccg 300
gttgggtcag agttccatgc tgggtgagca ggggtgcccg atccagagt tgaagacaga 360
ggcagaggag ctgtttgggg agaccatgga gatgatggac aggatgaaag acatggagtt 420
ggagctgctg cggggcagcc aggccatcat gctgcgctca gcggacctga caggactgga 480
gaagcgtgtg gagcagatcc gtgaccacat caatgggcgc gtgctctact atgccacctg 540
caagtgatgc tacagcttcc agcccgttgc cccactcatc tgccgccttt gcttttgg 598

```

<210> 287

<211> 316

<212> DNA

<213> Homo sapiens

<400> 287

```

ctgcccttca cctcgcagtg gacctgcaaa atcctgacct ggtgtcactc ctgttgaagt 60
gtggggctga tgtcaacaga gttacctacc agggctattc tccctaccag ctcacctggg 120
gccgcccag caccggata cagcagcagc tgggccagct gacactagaa aaccttcaga 180
tgctgccaga gagtgaggat gaggagagct atgacacaga gtcagagttc acggagttca 240
cagaggacga gctgccctat gatgactgtg tgtttggagg ccagcgtctg acgttatgag 300
cgcaaagggg ctgaaa 316

```

<210> 288

<211> 275

<212> DNA

<213> Homo sapiens

<400> 288

```

atgattagga gaagtgggtg ccacagtcga aaaatcccaa ggcccaaacc tgcaccactg 60
actgctgaaa tacagcaaaa gatthtgcac ttgccaacat cttgggactg gagaaatgtt 120
catggatatca atthtgcag tctgtttcga aaccaagcat cctgtggcag ctgtactca 180
tttgccttcta tgggtatgct agaagcgaga atccgtatac taaccaacaa ttctcagacc 240
ccaatcctaa gccctcagga ggttgtgtct tgtag 275

```

<210> 289

<211> 522

<212> DNA

<213> Homo sapiens

<400> 289

```

cagaagggaa caccagagct ttgctaataa ttagtgtggt caagagccgt ctgagcctaa 60
tgagtccag ctgcattagg ttaagagact cttccagagc catcgccagg tcgggaatgg 120
cacctctccc taggatacac agcctgcagg tcccaggac ctggatgaca cccgcctcac 180
tgtggcagtg tattgcctgt taattgctgc taattctaata tctgatgatg actcctactc 240
cattgtttac cccaaagcat cagctaggct ggagtgtatt gttacaaatg agcaaaagat 300
gagtccttgc ttcctcaga aataaaagga gtcagctgc agcgttgcac tgggcttctt 360
ggcctcccaa ctcttccac tcccagaatc cagaagtaag ctctgcatgt tccccttctt 420
gggaggaaac cagttgtcag aaggatgtat gatgacccc tcccctcca tccttcacct 480
cctaagcagt cctggccttt cctcatcact cccctctaca gt 522

```

<210> 290

<211> 331

<212> DNA

<213> Homo sapiens

<400> 290

```

aacaccagag ctttgctaata aattagtgtg gtcaagagcc gtctgagcct aatgagtccc 60
agctgcatta ggttaagaga ctcttcaga gccatcgcca ggtcttgaat ggcacctctc 120
cctaggatac acagcctgca ggtccccagg acctggatga caccgcctc actgtggcag 180
tgtattgcct gtttaattgct gctaattcta attctgatga tgactcctac tccattgttt 240
accceaaagc atcagctagg ctggagtgat ttgttacaac tgagcaaaag atgagtcctt 300
gcttcctca gaaataaaaag gagctcagct g 331

```

<210> 291

<211> 228

<212> DNA

<213> Homo sapiens

<400> 291

```

gagatgcaaa gcaggattca aaagaacatc tttgcgtttt ctaccggctc cccatcatcg 60
tactagggag gaagaagcgg gtgagaaaca aaacttcttt ccattgtcct gccggtttct 120
gcggacttgt tctgaggccg aggcacctct aagatactga tggctctgca gaggacccat 180
tcattgcttc tgtttttgct gctgaccctg ctggggctgg ggctggtc 228

```

<210> 292

<211> 342
 <212> DNA
 <213> Homo sapiens

<400> 292
 ggagctgtcc tgcaccgtgg tggagctgaa gtacacaggc aatgccagcg cactcttcat 60
 cctccctgat caagacaaga tggaggaagt ggaagccatg ctgctcccag agaccctgaa 120
 gcggtggaga gactctctgg agttcagaga gataggtgag ctctacctgc caaagttttc 180
 catctcgagg gactataacc tgaacgacat acttctccag ctgggcattg aggaagcctt 240
 caccagcaag gctgacctgt cagggatcac agggggccagg aaccctacag tctcccaggt 300
 ggtccataag gctgtgcttg atgtatttga ggagggcaca ga 342

<210> 293
 <211> 311
 <212> DNA
 <213> Homo sapiens

<400> 293
 ggagctgtcc tgcaccgtgg tggagctgaa gtacacaggc aatgccagcg cactcttcat 60
 cctccctgat caagacaaga tggaggaagt ggaagccatg ctgctcccag agaccctgaa 120
 gcggtggaga gactctctgg agttcacaga gataggtgag ctctacctgc caaagttttc 180
 catctcgagg gactataacc tgaacgacat acttctccag ctgggcattg aggaagcctt 240
 caccagcaag gctgacctgt cagggatcac agggggccagg aacctagcag tctcccaggt 300
 ggtccataag g 311

<210> 294
 <211> 402
 <212> DNA
 <213> Homo sapiens

<400> 294
 cggctgcgag aagacgacag aagggaagat ggaggaagtg gaagccatgc tgctcccaga 60
 gaccctgaag cgggtggagag actctctgga gttcagagag ataggtgagc tctacctgcc 120
 aaagttttcc atctcgaggg actataacct gaacgacgac ttctccagct gggcattgag 180
 gaagccttca ccagcaaggc tgacctgtca gggatcacag gggccaggaa cctagcagtc 240
 tcccaggtgg tccataaggc tgtgcttgat gtatttgagg agggcacaga agcatctgct 300
 gccacagcag tcaaaatcac cctcctttct gcattagtgg agacaaggac cattgtgcgt 360
 ttcaacaggc ccttctctgat gatcattgtg cctacagaca cc 402

<210> 295
 <211> 232
 <212> DNA
 <213> Homo sapiens

<400> 295
 ttccatctcg agggactata acctgaacga cgacttctcc agctgggcat tgaggaagcc 60
 ttcaccagca aggctgacct gtcagggatc acagggggcca ggaacctagc agtctcccag 120
 gtggtccata aggctgtgct tgatgtattt gaggagggca cagaagcatc tgctgccaca 180
 gcagtcaaaa tcaccctcct ttctgcatta gtggagacaa ggaccattgt gc 232

<210> 296
 <211> 435
 <212> DNA
 <213> Homo sapiens

<400> 296
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 ccaaaaggag ctgcaatttt aaagtcttct gatgtcatat catttactg tctaggctac 120
 aacaggattc taggtggagg ttgtgcatgt tgtccttttt atctgatctg cgattaaagc 180
 agtaatatatt taagatggac tgggaaaaac atcaactcct gaagttagaa ataagaatgg 240
 tttgtaaaaat ccacagctat atcctgatgc tggatggat taatcttgtg tagtcttcaa 300
 ctggttagtg tgaaatagtt ctgccacctc tgacgcacca ctgccaatgc tgtacgtact 360

gcatttgccc cttgagccag gtggatgttt accgtgtgtt atataactta ctggctcctt 420
cactgaacat gccta 435

<210> 297
<211> 309
<212> DNA
<213> Homo sapiens

<400> 297
atcatttcac tgtctaggct acaacaggat tctaagggga cgttgtgcat gttggccttt 60
gtatctgatac tgtgattaaa gcagtaatat tttaagatgg actgggaaaa acatcaactc 120
ctgaagtttag aaataagaat ggtttgtaaa atccacagct gtatgctgaa gctggatggg 180
attaatcttg cgtagtcttc aactgggttag gtgaaatagt tctgccacct ctgacgcacc 240
actgccaatg ctgtacgtac tggatttggc ccttgagcca ggtggatgtt caccgggcgt 300
gatataact 309

<210> 298
<211> 342
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> 342
<223> n = A,T,C or G

<400> 298
atcatttgac tgtctaggct acaacaggat tctagggtga ggttgtgcat gttgtccttt 60
ttatctgatac tgtgattaaa gcagtaatat tttaacatgg actgggaaaa acatcaactc 120
ctgaagtttag aaataagaat ggtttgtaaa atccacagct atatcctgat gctggatggg 180
attaatcttg tgtagtcttc aactgggttag ttgaaatagt tctgccacct ctgacgcacc 240
actgccaatg ctgtacgtac tgcatttgcc ccttgagcca ggtggatgtt taccgtgtgt 300
tatataactt cctggctcct tcaactgaaca tgcctagtcc an 342

<210> 299
<211> 266
<212> DNA
<213> Homo sapiens

<400> 299
gggacagaat ggctatctcg gaccttgtga aggtgactct gacttctgag gaagacgccc 60
gcttgaagaa gagagcccat acactttggg ggatccaaaa cgagctgcga ttttcaagtc 120
ttctgatgtc atatcattcc actgtctagg ctacaacagg attctagggg gacgttgtgc 180
atgttggcct ttttatctga tctgtgacta aagcactaat attttaagat ggactgggaa 240
aaacatcaac tcctgaagtt agaaat 266

<210> 300
<211> 383
<212> DNA
<213> Homo sapiens

<400> 300
ggacagaatg gaatctcaga ccttgtgaag gtgactctga cttctgagga agaggcccgt 60
ttgaagaaga gtgcagatac actttggggg atccaaaagg agctgcaatt ttaaagtctt 120
ctgatgtcat atcatttcac tgtctaggct acaacaggat tctagggtga ggttgtgcat 180
gttgaccttt ttatctgatac tgtgattaaa gcagtaatat tttaagatgg actgggaaaa 240
acatcaactc ctgaagtttag aaataagaat ggtttgtaaa atccacagct atatcctgat 300
gctggatggg attaatcttg tgtagtcttc aactgggttag tgtgaaatag ttctgccacc 360
tctgacgcac cactgccaat gct 383

<210> 301
<211> 453

<212> DNA

<213> Homo sapiens

<400> 301

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aaccgcttct ccgttgaaca acatactaga tggggacaga atggaatctc agaccttgtg 60
aaggtgactc tgacttctga ggaagagggc cgtttgaaga agagtgcaga tacactttgg 120
gggatccaaa aggagctgca attttaaagt cttctgatgt catatcattt cactgtctag 180
gctacaacag gattctaggt ggaggttgtg catgttgtcc tttttatctg atctgtgatt 240
aaagcagtaa tattttaaga tggactggga aaaacatcaa ctctgaagt tagaaataag 300
aatggtttgt aaaatccaca gctatatcct gatgctggat ggtattaatc ttgtgtagtc 360
ttcaactggg tagtgtgaaa tagttctgcc acctctgacg caccactgcc aatgctgtac 420
gtactgcatt tgccccttga gccaggtgga tgt 453

```

<210> 302

<211> 383

<212> DNA

<213> Homo sapiens

<400> 302

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ggacagaatg gaatctcaga ccttgtgaag gtgactctga cttctgagga agaggcccg 60
ttgaagaaga gtgcagatac actttggggg atccaaaagg agctgcaatt ttaaagtctt 120
ctgatgtcat atcatttcac tgtctaggct acaacaggat tctaggtgga ggttgtgcat 180
gttgaccttt ttatctgac tgtgattaaa gcagtaatat tttaagatgg actgggaaaa 240
acatcaactc ctgaagttag aaataagaat ggtttgtaaa atccacagct atatcctgat 300
gctggatggg attaactctg tgtagtcttc aactggttag tgtgaaatag ttctgccacc 360
tctgacgcac cactgccaat gct 383

```

<210> 303

<211> 97

<212> DNA

<213> Homo sapiens

<400> 303

```

gttgcccttg agatgatcaa agtaactggg ggctatccat ttgaagctta caaaaattgt 60
tttcttaact tagccattcc aattgtagta tttacag 97

```

<210> 304

<211> 442

<212> DNA

<213> Homo sapiens

<400> 304

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gccctagtta ttataccata ttacatcatt actctatgta attatctatg aagctatgta 60
gttatttacc cctgtattaa gtgattttag actgttggtta ttttttgagt tacagcatgt 120
gctttcaaaa tagggagact gtatggttga attaataatt ttttaaataa ctgttaacat 180
gtatagagta gggtgaaagt ttgaaagtat aaaatatact aaaagtatac agacctgtaa 240
taagaaattt atattactat agtcccatag ctgcttttac tatccacaga gaaatgcttg 300
aaaacgtgaa agttgaatag atgcaattaa aatcacggat agtttttaggc tgtttatatt 360
atcagatcac cttcttttat ctaggttgcc ttggagatga tcaaagtaac tgggtggctat 420
ccatttgaag cttacaaaaa tt 442

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<210> 305

<211> 380

<212> DNA

<213> Homo sapiens

<400> 305

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gagacgttcg cacacctggg tgccagcgcc ccagaggtcc cgggacagcc cgaggcgccg 60
cgcccgccgc cccgagctcc ccaagccttc gagagcgccg cacactcccg gtctccactc 120
gctcttccaa caccgcctcg ttttgccggc agctcgtgtc ccagagaccg agttgcccc 180
gagaccgaga cgccgcggct gcgaaggacc aatgagagcc ccgctgctac cgccggcgcc 240
gggtgtgctg tcgctcttga tactcggctc aggccattat gctgctggat tggacctcaa 300

```

tgacacctac tctgggaagc gtgaaccatt ttctggggac cacagggtctg atggatttga 360
 ggttacctcc agaaggagg 380

<210> 306
 <211> 133
 <212> DNA
 <213> Homo sapiens

<400> 306
 ccagtactgc ctctgtgtct cgtgccaaaga cacagtgaat ataacccccca gctcagcctc 60
 ctggccaagt tccgcagcgc ctccctgcac agtgagccac tcatgccaca caacgccacc 120
 tatctgtact ctt 133

<210> 307
 <211> 428
 <212> DNA
 <213> Homo sapiens

<400> 307
 tccagtactg cctcctgtgc tctgtccaag acacagtgaataataaccccc agctcagcct 60
 cctggccaag ttccgcagcg cctccctgca cagtgaagcca ctcatgccac acaacgccac 120
 ctatcctgac tctttccagc agcctccgtg ctctgcactc cctccctcac ccagccacgc 180
 gttctcccag tccccgtgca cggccagcta cctcactcc ccaggaagtc cttctgagcc 240
 agagagtccc tatcaacact cagactttcg accagtttgt tacgaggagc cccactgggt 300
 gctcggtcgc ctactatgaa ctgaacaacc gagttgggga gacattccag gcttcctccc 360
 gaagtgtgct catagatggg ttcaccgacc cttcaataa caggaacaga ttctgtcttg 420
 gacttctt 428

<210> 308
 <211> 497
 <212> DNA
 <213> Homo sapiens

<400> 308
 cggctgcgag aagacgacag aaggggggaa tgtgtctggc ccttcagcag tttctcttgg 60
 cagcatcagc tgggctgctt tctttgtgtg tggccccagg tgtcaaaatg acaccagctg 120
 tctgtactag acaagggttac caagtgcgga attggttaat actaacagag agatttgctc 180
 cattctcttt ggaataacag gacatgctgt atagatacag gcagtaggtt tgctctgtac 240
 ccatgtgtac agcctaccca tgcagggact gggattcgag gacttccagg cgcataagggt 300
 agaaccaaata gatagggtag gagcatgtgt tctttagggc cttgtaaggc tgtttccttt 360
 tgcattctgga actgactata taattgtctt caatgaagac taattcaatt ttgcatatag 420
 aggagccaaa gagagatttc agctctgtat ttgtggtatc agtttggaaa aaaaaaatct 480
 gatactccat ttgatta 497

<210> 309
 <211> 356
 <212> DNA
 <213> Homo sapiens

<400> 309
 gggaatgtgt ctggcccttc agcagtttct cttggcagca tcagctgggc tgctttcttt 60
 gtgtgtggcc ccagggtgtca aaatgacacc agctgtctgt actagacaag gttaccaagt 120
 gcggaatttg ttaatactaa cagagagatt tgctccattc tctttggaat aacaggacat 180
 gctgtataga tacaggcagt aggtttgctc tgtacccatg tgtacagcct acccatgcag 240
 ggactgggat tgcaggactt ccaggcgcac agggtagaac caaatgatag ggtaggagca 300
 tgtgttcttt aaggccttgt aaggctgttt ctttttgcac ctggaactga ctatat 356

<210> 310
 <211> 348
 <212> DNA
 <213> Homo sapiens

<400> 310
 gggaatgtgt ctggcccttc agcagtttct cttggcagca tcagctgggc tgctttcttt 60
 gtgtgtggcc ccagggtgtca aaatgacacc agctgtctgt actagacaag gttaccaagt 120
 gcggaattgg ttaatactaa cagagagatt tgctccattc tctttggaat aacaggacat 180
 gctgtataga tacaggcagt aggtttgctc tgtacccatg tgtacagcct acccatgcag 240
 ggactgggat tgcaggactt ccaggcgcat agggtagaac caaatgatag ggtaggagca 300
 tgtgttcttt agggccttgt aaggctgttt ccttttgcac ctggaact 348

<210> 311
 <211> 337
 <212> DNA
 <213> Homo sapiens

<400> 311
 aagttgtggt ctgacacaca ctgctgtggt tcccctggat ttagtgaaat gccgtatgca 60
 ggtggacccc caaaagtaca agggcatatt taacggattc tcagttacac ttaaagagga 120
 tgggtgttcgt ggtttggcta aaggatgggc tccgactttc cttggctact ccatgcaggg 180
 actctgcaag tttggctttt atgaagtctt taaagtcttg tatagcaata tgcttggaga 240
 ggagaatact tatctctggc gcacatcact atatttggct gcctctgcca gtgctgaatt 300
 ctttgctgac attgccctgg ctccatgga agctgct 337

<210> 312
 <211> 252
 <212> DNA
 <213> Homo sapiens

<220>
 <221> misc_feature
 <222> 144
 <223> n = A,T,C or G

<400> 312
 agcccaagcc ctcagtggaa cctgtcaaga gcatcagcag catggagctg aagaccgagc 60
 cctttgatga cttcctgttc ccagtgcac ttcagagagc tggtagttag tagcatgttg 120
 agccaggcct gggctgtgt ctentttctc tttctcctta gtcttctcat agcattaact 180
 aatctattgg gttcattatt ggaattaacc tgggtgctga tattttcaaa ttgtatctag 240
 tgcagctgat tt 252

<210> 313
 <211> 51
 <212> DNA
 <213> Homo sapiens

<400> 313
 actcccagct gcaactgggta cacgtcttcc ttctgtttca cctacccccga g 51

<210> 314
 <211> 348
 <212> DNA
 <213> Homo sapiens

<400> 314
 atggccacag agctggagcc cctgtgcact ccggtgggtca cctgtactcc cagctgcact 60
 gcttacacgt cttccttcgt cttcacctac cccgaggctg actccttccc cagctgtgca 120
 gctgcccacc gcaagggcag cagcagcaat gaggcttccct ctgactcgct cagctcacc 180
 acgctgctgg ccctgtgagg gggcagggaa ggggaggcag ccggcaccca caagtgccac 240
 tgcccagact ggtgcattac agagaggaga aacacatctt ccctagaggg ttcctgtaga 300
 cctagggagg accttatctg tgcgtgaaac acaccaggct gtgggccc 348

<210> 315
 <211> 507
 <212> DNA

<213> Homo sapiens

<400> 315

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ccggtgggtca cctgtactcc cagctgcact gcttacacgt cttccttcgt cttcacctac 60
cccagggtctg actccttccc cagctgtgca gctgcccacc gcaagggcag cagcagcaat 120
gagccttccct ctgactcgct cagctcacc acgctgctgg ccctgtgagg gggcagggaa 180
ggggaggcag ccggcaccca caagtgccac tgcccagact ggtgcattac agagaggaga 240
aacacatctt ccctagaggg ttcctgtaga cctagggagg accttatctg tgcgtgaaac 300
acaccaggct gtgggcctca aggacttgaa agcatccatg tgtggactca agtccttacc 360
tcttcgggag atgtagcaaa acgcatggag tgtgtattgt tcccagtgac acttcagaga 420
gctggtagtt agtagcatgt tgagccaggc ctgggtctgt gtctcttttc tctttctcct 480
tagtcttctc atagcattaa ctaatct 507
```

<210> 316

<211> 239

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> 223

<223> n = A,T,C or G

<400> 316

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agactccaag ccctactggg aggcacggag ggtggcgagg caggctcagc tggaagctca 60
gaaagccacg caggacttcc agagggccac agaggtgctc cgcgccgcca aggagaccat 120
ctccctggcc gagcagcggc tgctggagga tgacaagcgg cagttcgact ccgcctggca 180
ggagatgctg aatcacgcca ctgagagggt catggaggcg ganagaccaa gaccaggag 239
```

<210> 317

<211> 313

<212> DNA

<213> Homo sapiens

<400> 317

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catcagtgat agggatgatt cacaaacaca aagctgggtct tttcaaaatg ggaagaaaaa 60
agatgcaatt gatcccttac tattcaagta taaagtgcaa cccactaaaa aagaattaca 120
tgagtctgct attgttaaag caacacaaat cagccggaga aaacacctat tttctcgtga 180
taaactaaag ctttttctga agcaacactg ggaaccacaa gatggagtca ttaaaataaa 240
ggcatcatct ctttcaacgg ataaaatagc cgaacaagat tttttcttat ttcttcctg 300
atgattccac ccc 313
```

<210> 318

<211> 574

<212> DNA

<213> Homo sapiens

<400> 318

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aaataacatc aacagaacag cttcactttg ggccaaacat ttgaaaaact ttttataaaa 60
aattgtttga tatttcttaa tgtctgctct gagccttaaa acacagattg aagaagaaaa 120
gaaagaaaaa acttaaatat ttatttctat gctttgttgc ctctgagaat aatgacaatt 180
tatgaatttg tgtttcaaat tgataaaata tttaggtaca aataacaaga ctaataatat 240
tttcttattt aaaaaaagca tgggaagatt tttatttatac aaaatataga ggaaatgtag 300
acaaaatgga tataaatgaa aattaccatg ttgtaaaacc ttgaaaatca gattctaact 360
ggattttgtat gcaactaagt atttttctga acacctatgc aggtcttatt tacagtagtt 420
actaagggaa cacacaaaga attacacaac gttttcctca agaaaatggt acaaaacaca 480
accgaggagc gtatacagtt gaaaacattt ttgttttgat tgggaaggcag attatattat 540
attagtatta aaaatcaaac cctatgtttc tttc 574
```

<210> 319

<211> 518

<212> DNA

<213> Homo sapiens

<400> 319

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gaagggaat aacatcaaca gaacaacttc actttgggcc aaacatttga aaaacttttt 60
ataaaaaatt gtttgatatt tcttaatgtc tgctctgagc cttaaaacac agattgaaga 120
agaaaagaaa gaaaaaactt aaatatattt ttctatgctt tgttgccctc gagaataatg 180
acaatttatg aatttgtgtt tcaaattgat aaaatattta ggtacaaata acaagactaa 240
taatattttc ttatttaaaa aaagcatggg aagattttta tttatcaaaa tatagaggaa 300
atgtagacaa aatggatata aatgaaaatt accatgttgt aaaaccttga aaatcagatt 360
ctaactggat ttgtatgcaa ctaagtattt ttctgaacac ctatgcaggt cttatttaca 420
gtagttacta agggaaacaca caaagaatta cacaacgttt tcctcaagaa aatggtacaa 480
aacacaaccg aggagcgtat acagttgaaa acattttt 518

```

<210> 320

<211> 353

<212> DNA

<213> Homo sapiens

<400> 320

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aaataacatc aacagaacaa cttcactttg ggccaaacat ttaaaaaact tttataaaaa 60
aaatgtttga tatttcttaa tgtctgctct gagccttaca acacagattg aagaagaaaa 120
gaaagaacaa acttagatat ttatttctat gctttgttgc ctctgagaat aatgacaatt 180
tatgaatttg agtttcaaat tgataaaaata tttagggtact aataacaaga ctaataatat 240
tttcttattt ataaaaagca tgggaagatt tttattttatc aaaatataca ggaagtgtag 300
acaaaatgga tataaatgaa aattaccatg ttgtaaaacc ttgaaaatca gag 353

```

<210> 321

<211> 401

<212> DNA

<213> Homo sapiens

<400> 321

```

gacctgcaca cagagactcc ctctctgggt cctggcacca tggccccctg aagagctggc 60
cctggtcacc ctctctctgg gggcttctct gcagcacatc cacgcagctc gagggaccaa 120
tgtgggccgg gagtgtctgc tggagtactt caagggagcc attccccctt gaaagctgaa 180
gacgtggtac cagacatctg aggactgtct cagggatgcc atcgtttttg taactgtgca 240
gggcagggcc atctgttcgg accccaacaa caagagagtg aagaatgcag ttaaatacct 300
gcaaagcctt gagaggtctt gaagcctcct caccacagac tcctgactgt ctccccggag 360
tacctgggac ctccaccggt ggtgttcacc gccccaccc t 401

```

<210> 322

<211> 547

<212> DNA

<213> Homo sapiens

<400> 322

```

gacctgcaca cagagactcc ctctctgggt cctggcacca tggccccact gaagatgctg 60
gccctggtca ccctctcctt gggggcttct ctgcagcaca tccacgcagc tcgagggacc 120
aatgtgggcc gggagtgtct cctggagtac ttcaagggag ccattccccct tagaaagctg 180
aagacgtggt accagacatc tgaggactgc tccagggatg ccatcgtttt tgtaactgtg 240
cagggcaggg ccattctgtt ggacccaac aacaagagag tgaagaatgc agttaaatac 300
ctgcaaagcc ttgagaggtc ttgaagcctc ctacccccag actcctgact gtctccccgg 360
actacctggg acctccaccg ttggtgttca ccgccccac cctgagcgcc tgggtccagg 420
ggaggccttc cagggacgaa gaagagccac agtgagggag atcccatccc cttgtctgaa 480
ctggagccat gggcacaaag ggcccagatt aaagtcttta tcctcaaaaa aaaaaaaaaa 540
aaaaaaa 547

```

<210> 323

<211> 283

<212> DNA

<213> Homo sapiens

<400> 323

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ctgagcagag ggacctgcac acagagactc cctcctgggc tcctggcacc atggccccac 60
tgaagatgct ggccctgggc accctcctcc tgggggcttc tctgcagcac atccacgcag 120
ctcgagggac caatgtgggc cgggagtgct gcctggagta cttcaagga gccattcccc 180
ttagaaagct gaagacgtgg taccagacat ctgaggactg ctccagggat gccatcggtt 240
ttgtaactgt gcagggcaggt gccatctgtt cggaccccaa caa 283

```

<210> 324

<211> 160

<212> DNA

<213> Homo sapiens

<400> 324

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gcggtgacga cggggaccat tttaccatca ccaccacccc tgagagcaac cagggcatcc 60
tgacaaccag gaaggggttg gattttgagg caaaaaacca gcacaccctg tacgttgaag 120
tgaccaacga ggcccctttt gtgctgaagc tcccaacctc 160

```

<210> 325

<211> 300

<212> DNA

<213> Homo sapiens

<400> 325

```

tttttttttg gggccaattc ttttaatttaa ctaaattagg aacgcagctt ttacagaaca 60
ataaacacaa gggacggggc caccacagga tctaacagct tttcaggga ctaggttgca 120
agctcaaaaag taatccacta acgaaccaag tcaaaactcca gtttttaata aaaaggggct 180
gggggaggtt gtcaaaccac ttccaatata aatccccaat ccgagggcca ccaaataaaa 240
aagcaccaaaa aatggaagga aaactttcaa aaattctgca aaaaatatgc cccctttttt 300

```

<210> 326

<211> 394

<212> DNA

<213> Homo sapiens

<400> 326

```

gtctattctt ttatttttact aaattaggaa cgcagcattt acagaacaat aaacacaagt 60
gacgtggcca ccccaggatc taacagctct tcagtgaagt atgttgcaag ctacagaagta 120
atccactaac gaaccaagtc agactccagt tcttcatcaa aagggtgctg tggaggttgt 180
cagacgcctt ccaatataga tccccaatcc gatggccagc aaatgagaga gcagcagaga 240
tggaaggaaa acttccagaa attctgcaga gaatatgccc cctttcttca tgacgctcgt 300
gttcccccat gctgaaggtg gccgtgcgct tccggtgttt aaagaagaac ccttgggggg 360
aatatttccc ggccatttga ccaatcccat tcca 394

```

<210> 327

<211> 524

<212> DNA

<213> Homo sapiens

<400> 327

```

gtctattctt ttatttttact aaattaggaa cgcagcattt acagaacaaa taaacacaag 60
tgacgtggcc accccaggat ctaacagctc ttcagtgaag tatgttgcaa gctcagaagt 120
aatccactaa cgaaccaagt cagactccag ttcttcatca aaaggtgctg gtggaggttg 180
tcagacgcct tccaatatag atccccaatc cgatggccag caaatgagag agcagcagag 240
atggaaggaa aactttcaga aattctgcag agaatatgcc ccctttcttc atgacgctcg 300
tgttcctcat gctgaggttg ccgtgcgctt ccggtgttta aagaagaacc cttgggggga 360
atatttccgg ccgacttgac caatcccata tccatctgat ttttcttcca gaagctttca 420
cttccttctt ccttcaatat cactccctca actgtgactg ttttcccccc aatgctatgg 480
tttctgttca aaaccccggt ggttctgttg ggtcgtact ccgt 524

```

<210> 328

<211> 55

<212> DNA
<213> Homo sapiens

<400> 328
ggccgcctt tttttttttt ttttttcggg ggcgtttttt gatttttaaa attgg 55

<210> 329
<211> 463
<212> DNA
<213> Homo sapiens

<400> 329
tcactatagg gaaagctggt acgcctgcag gtaccgggtcc ggaattcccg ggtcgaccca 60
cgcgtccgcc gcccccgaga cctgtgaaga aaaccatctt gtgaggggct gcctggactg 120
gtctggcagg ttgggcctgg atggggaggc tctagcatct ctcataagggt caacctgaga 180
gtgggggagc taagccatga ggtaggggca ggcaagagag aggattcaga cgctctggga 240
gccagttcct agtcctcaac tccagccacc tgccccagct cgacggcact gggccagttc 300
ccccctctgt ctgcagctcg gtttcctttt ctagaatgga aatagtgagg gccaatgccc 360
agggttgagg ggaggagggc gttcatagaa gaacacacat gcgggcacct tcatcgtgtg 420
tggcccactg tcagaactta ataaaagtca actcatttgc tgg 463

<210> 330
<211> 274
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> 144, 218, 268
<223> n = A,T,C or G

<400> 330
ccgccccga gaccatgtga agaaaaccat cttgtgaggg gctgcctgga ctgggtctggc 60
agggtgggcc tggatgggga ggctctagca tctctcatag gtgcaacctg agagtggggg 120
agctaagcca tgaggtaggg gcangcaaga gagaggattc agacgctctg ggagccagtt 180
cctagtcttc aactccagcc acctgcccc a gctcgacngc actggggccag ttccccctct 240
gctctgcagt cggtttcctt ttctagantg gaaa 274

<210> 331
<211> 232
<212> DNA
<213> Homo sapiens

<400> 331
cggctgtgag aatacgacag aagggtccgg ctgcgagaag acgacagaag ggggatctca 60
gcggggagcc acgtctcttg cactgtgggtc tctgcatgga ccccagggct gtggggactt 120
gggggacagt aatcaagtaa tccccctttc cagaatgcat taaccacact ccctgacctc 180
acgctggggc aggtccccaa gtgtgcaagc tcagtattca tgatgggtggg gg 232

<210> 332
<211> 321
<212> DNA
<213> Homo sapiens

<400> 332
gttgtgttga gatccagtgc agttgtgatt tctgtggatc ccagcttggt tccaggaatt 60
tttgttgatt gggttaaatc cagttttcaa tcttcgacag ctgggctgga acgtgaactc 120
agtagctgaa cctgtctgac ccggtcacgt tcttgatcc tcagaactct ttgctcttgt 180
cggggtgggg gtgggaactc tcgtgaggag gcggagctgt gtaaatgcca cgactccgta 240
attcttattc ggtgggacct tgcttcctc tgggagctgg ctcgttttgt tgggtgtctaa 300
cctttcgccg aatcgttaaa g 321

<210> 333
 <211> 344
 <212> DNA
 <213> Homo sapiens

<220>
 <221> misc_feature
 <222> 265, 267, 272, 337
 <223> n = A,T,C or G

<400> 333
 gtcctatttc tcattttgtt gataatttct gcatttaatg gtctgtgctt taaatggtaa 60
 cgctacggcc ccaggtcact gcgaggcact taccatgtag atacgggctc aaaagtcacc 120
 tctcagagac ctacgtcacc cactcaggaa ttccgcgcctc tcatacttgc ctgtctcatt 180
 ttatcttctt tctagcagct gtctgaaatt ggttcgtctg ttttcttgtt tatggatttc 240
 tcaagccctt gacagaccgg ctagnngngt tntcccgtgc atcttcagcc tggcacatta 300
 tggacactta aatactacgt attgatctaa tattganggg ttaa 344

<210> 334
 <211> 405
 <212> DNA
 <213> Homo sapiens

<400> 334
 ggcacgaggg atgaagggtg ctgctcattt tcattagatg tatgtgaagg cacagtgaaa 60
 atggaaatgt tcttggagct acttccctcaa aatgtatcct tagtcacctc agtgcaacag 120
 ctgggagggg gccgtgttaa gatttttttt gctacaaaga ggagggtggca atggtagatc 180
 cacccttatg cttctcagtt tagcataacc tcttatggat ttcatcaaa ttcagcgtgt 240
 tggtcactgg aaagagcctt ttcccttctcc ttttcttact ctcccctcat ggggttcccc 300
 tcttaaagga gaggagcttt taatttacac ttaccacctc atttgctttt ttggaggcca 360
 tgccatataa gcgggactac cgagttaatc tcctttttac aaaag 405

<210> 335
 <211> 227
 <212> DNA
 <213> Homo sapiens

<400> 335
 ggatgaacta ttcagatgct atcgtttggc taaaagaaca tgatgtaaag aaagaagatg 60
 gaactttcta tgaatttggg gaagatatcc cagaagctcc tgagagactg atgacagaca 120
 ccattaatga accaatcttg ctgtgtcgat ttctgttgga gatcaagtcc ttctacatgc 180
 agcgatgtcc tgaggattcc cgtcttactg aatctgtcga cgtgttg 227

<210> 336
 <211> 521
 <212> DNA
 <213> Homo sapiens

<400> 336
 tcgaattcgg atgaactatt cagatgctat cgtttggcta aaagaacatg atgtaaagaa 60
 agaagatgga acttttctatg aatttggaga agatatccca gaagctcctg agagactgat 120
 gacagacacc attaatgaac caatcttgcgt gtgtcgattt cctgtggaga tcaagtcctt 180
 ctacatgcag cgatgtcctg aggattcccg tcttactgaa tctgtcgacg tgttgatgcc 240
 caatgttggg gagattgtgg gaggtcfaat gcgtatcttt gatagtgaag aaatactggc 300
 aggttataaa agggaaggga ttgacccac tccctattac tggatatacg atcagagaaa 360
 atacggtaca tgtcccatg gaggatattg cttgggcttg gaacgattct taacgtggat 420
 tctgaatagg taccacatcc gagacgtgtg cttataccct cgatttgcac agcgttgcac 480
 gccataacca ttttctccag aagcgtggag gaaagattat g 521

<210> 337
 <211> 325
 <212> DNA

<213> Homo sapiens

<400> 337

```

ggactttccc gatcgccagg caggagtttc tctcgggtgac tactatcgct gtcattgtctg 60
gtcgtggcaa gcaaggaggc aaggcccgcg ccaaggccaa gtcgcgctcg tcccgcgcgg 120
gccttcagtt cccggtaggg cgagtgcata gcttgctgcg caaaggcaac tacgcggagc 180
gagtgggggc cggcgcgccc gtctacatgg ctgcggttcct cgagtatctg accgctgaga 240
tcttgagctt ggcgggcaac gcggctcggg acaacaagaa gacgcgcata atccctcgct 300
acctccagct ggccatccgc aacga                                     325

```

<210> 338

<211> 401

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> 264

<223> n = A,T,C or G

<400> 338

```

cgttgctgtc ggttttagga aacctggcat ggtgctttca ggtctggggc ttttagagcc 60
ccccgtgtgg cttacaaatt ctacagcata cagagcaggc cacgctcagg cccggcatgc 120
gggccaccaa gttctggaaa ccacgtggtg tccctgcgaa tggggcgatc aagtccagag 180
ccggggcact ttcagagttt gaaggttaact gagagcagat ggtcctccat ttcaactcca 240
gaagtggggc tctgggaggg atgntctaac cctccctggc atgtcacaa caggctctgg 300
ctggaggatc cctccatccg gctcctgtca tcccctacac tttggcctag caagaaggagg 360
aataaccact tgtgtgtctca ttactgttgg gaggaacaaa g                                     401

```

<210> 339

<211> 460

<212> DNA

<213> Homo sapiens

<400> 339

```

catgcggggc accaagttct ggaaaccacg tgggtgtccct gcgaatgggg cgatcaagtc 60
cagagccggg gcactttcag agtttgaagg taactgagag cagatgggtcc tccatttcaa 120
ctccagaagt ggggctctgg gagggatggt ctagccctcc ctggcatgtc agaaccaggc 180
tctgcctgga ggatccctcc atccggctcc tgtcatcccc tacacttttg ccaagcaaga 240
agtggtagaa ccacttggct gctccttctt tctggaggac acacagtctc agtccagatg 300
ccttctgtgc tttctggccc tttctggacc agatcctact cttcctttct aaatctgaga 360
tctccctcca gggaatccgc ctgcagagga cagagctggc tgtcttcccc caccctaac 420
ctggcttatt cccaactgct ctgcccactg tgaaaccact                                     460

```

<210> 340

<211> 496

<212> DNA

<213> Homo sapiens

<400> 340

```

tttttttttt tttttttttt tttttgggat tcttaaatat agatgtattt ttttcatctc 60
atctccggac aactccaat cacacccctc ctgccctccc ctctcaactg caaaccaagc 120
ggtgcagaca cagcacagca cacatgaggg gccctccctt tcaccaaagc tgaaggcagg 180
gcacagtttg gggatggaag agcctcgagg taaatgtggg ggttctagaa cccagtgacc 240
tcagtctctg atcatgggaa agggatcagt atgcagtaac gtggtaaggt tccagatcta 300
gaagccagga cctagaacct agtggtttca cagtgggagc agcagttggg aataagccag 360
gttaggggtg ggggaagaca gccagctctg tctctgcag gcggattccc tggagggaga 420
tctcagattt agaaaggaag agtaggatct ggtccagaaa gggccagaaa gacagggaag 480
catctggact gagact                                     496

```

<210> 341

<211> 283

<212> DNA

<213> Homo sapiens

<400> 341

```

tttttttttt tttttttttt ttttttttag gatttgaata catttattgt gacaagaatg 60
ctgttataaa tattcataag caaaggccat ctttttatct aggaattgtc aaagagaaga 120
ttccaaattg gaaggataca tcttttgtaa aatctgccac caattcctgc tttgagaata 180
agcacctatt gtaaaatttc tactaacatt ataaatgggc acagcacatg ccacttgata 240
caatccaaac tttgaaatgt ttgacttctc agtgggctgt ccc 283

```

<210> 342

<211> 335

<212> DNA

<213> Homo sapiens

<400> 342

```

tgtcgggagc caggcgcagc ccagcctcga aatgcagaac gacgccggcg agttcgtgga 60
cctgtacgtg ccgcggaaat gctccgctag caatcgcatc atcggtgcca aggaccacgc 120
atccatccag atgaacgtgg ccgagggtga caaggtcaca ggcaggttta atggccagtt 180
taaaacttat gctatctgcg gggccattcg taggatgggt gagtcagatg attccattct 240
ccgattggcc aaggccgatg gcatcgtctc aaagaacttt tgactggaga gaatcacaga 300
tgtggaatat ttgtcataaa taaataatga aaacc 335

```

<210> 343

<211> 75

<212> DNA

<213> Homo sapiens

<400> 343

```

gggtagagtt cttaaactga gatctggagg tagatggacg ctttgtaacc ctccagatct 60
gggacactgc agggc 75

```

<210> 344

<211> 611

<212> DNA

<213> Homo sapiens

<400> 344

```

gccggggggc agcggcgggc gcgagcggca gctgtcaggc caccgaggtc caagccgcac 60
ttgctgcccc attgaggacg aggaggcagc aggagcagtg acggtgactc taaggagccg 120
gattccccggc acgcagagct gacctgcctg gcacccgcgg ccctctcctg tttccttccc 180
attgtgttgg caccctaaaa agaaagaata aaacaacaac agggaaaaaa ggaaaatatt 240
taaattgtga caaaaaccca ctgggttctc ttggttaca actccttccc ttctggtgct 300
acaaaaatga gtgggaaatc cctgctctta aaggtcattc tcttggtgga tgggtggagt 360
gggaaaagtt cgcttatgaa ccgttacgta accaacaat ttgactccca ggcttttcac 420
accatagggg tagagttctt aaatcgagat ctggaggtag atggacgctt tgtaaccctc 480
cagatctggg aactgcagg gcaggaacgt ttcaagagcc ttaggacacc cttctacagg 540
ggagcagact gctgcctctt gaccttcagc gtggatgatc ggcagagctt cgagaatctt 600
ggtaactggc a 611

```

<210> 345

<211> 441

<212> DNA

<213> Homo sapiens

<400> 345

```

ggcctttgca agcctcaccg gcgatgcaag gatagtcac aacaggggcc ggggtggagt 60
ccagagccac cggctgactg tggaggaccc ggtcactgtg gactacatca cccgctacat 120
cgccagtctg aagcagcgtt atacgcatag cactggggcg aggcgttttg catctctgcc 180
ctcatcggtg gtttctactt tgatggcact cctaggctct atcagactga cccctctgtc 240
acataccatg cctggaaggc caatgccata cgccgggggt ccaactcagt gcgtgagttc 300
ctggagaaga actatactga cgaagccatt gtaacatat atctgaccat taagctggtg 360

```


atcaacgcac tcttggaagt ggttcactca ggtggcaaaa acattgaact tgctgtcatg 420
 aggcgagatc aatccctcaa g 441

<210> 346

<211> 323

<212> DNA

<213> Homo sapiens

<400> 346

ggcctttgca ggcctcaccg ccgatgcaag gatagtcac aacagggccc ggggtggagtg 60
 ccagagccac cggctgactg tggaggaccc ggtcactgtg gactacatca cccgctacat 120
 cgccagtctg aagcagcgtt atacgcacag caatgggcgc aggcgttttg catctctgcc 180
 ctcatcgtgg gtttcgactt tgatggcact cctaggctct atcagactga cccctcgggc 240
 acataccatg cctggaaggc caatgccata tgccgggggtg ccaagtcagt gcgtgagttc 300
 ctggagaaga actatactga cga 323

<210> 347

<211> 567

<212> DNA

<213> Homo sapiens

<400> 347

ccagcggcct cttccccttc ctggtgctgc ttgccctggg aactctggca ccttgggctg 60
 tggaaaggctc tggaaagtcc ttcaaagctg gactctgtcc tctaagaaa tctgcccagt 120
 gccttagata caagaaacct gactgccaga gtgactggca gtgtccaggg aagaagaaat 180
 gttgtcctga cacttgtggc atcaaagctc tggatcctgt tgacacccca aaccaacaa 240
 ggaggaaagc tgggaagtgc ccagtgaact atggccaatg tttgatgctt aacccccca 300
 atttctgtga gatggatggc cagtgcgaagc gtgacttgaa gtgttgcatg ggcatgtgtg 360
 ggaaatcctg cgtttcccct gtgaaagctt gattcctgcc atatggagga ggctctggag 420
 tctgtctctg tgtgttccag gtcccttcca ccctgagact tggctccacc actgatatcc 480
 tcctttgggg aaaggcttgg cacacagcag gctttcaaga agtgccagtt gatcaatgaa 540
 taaataaacg agcctatttc tctttgc 567

<210> 348

<211> 314

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> 48

<223> n = A,T,C or G

<400> 348

atgaagtcca gcggcctctt ccccttccctg gtgctgcttg ccctgggnac tctggcacct 60
 tgggctgtgg aaggctctgg aaagtccttc aaagctggag tctgtcctcc taagaaatct 120
 gccagtgcc ttagatacaa gaaacctgag tgccagagtg actggcagtg tccagggaag 180
 aagagatgtt gtctgacac ttgtggcatc aaatgcctgg atcctgttga ccccccaaac 240
 ccaacaagga ggaagcctgg gaagtgccca gtgacttatg gccaatgttt gatgcttaac 300
 ccccccaatt tctg 314

<210> 349

<211> 611

<212> DNA

<213> Homo sapiens

<400> 349

ggctctgctc tgcagcacac ccgtgggtga cccctcacc cagaagcagc agtggcagct 60
 tgggaaatgt gaggaaggga aggagggaga gacgggaggg aggagagaga ggagaaggga 120
 ggcaggggag gggcagcaga accaaggcaa atatttcagc tgggctatac cctctcccc 180
 atccctgtta tagaagctta gagagccagc cagcaatgga accttctggt tcttgccca 240
 atcgccacca gtatcaattg tgtgagcttg ggtgcgagtg cacgcgtgcg tgagtacgga 300

```

gagtatatat agatctctat ctcttagcaa aggtgaatgc cagatgtaaa tggcgccctct 360
gggcaaagga ggcttgtatt ttgcacattt tataaaaact tgagagaatg agatttctgc 420
ttgtatattt ctaaaaagag gaaggagccc aaaccatcct ctcttacca ctcccatccc 480
tgtgagccct accttacccc tctgccccta gccaaaggag gtgaatttat agatctaact 540
ttcataggca aaacaaaagc ttcgagctgt tgcgtgtgtg agtctgttgt gtggatgtgc 600
gtgtgtgtgc c                                     611

```

<210> 350

<211> 370

<212> DNA

<213> Homo sapiens

<400> 350

```

tggctggatg ggcttggact gtggtcctga aagcagcaag aagtatgctg aggctgtcac 60
tcgggctaag cagattgtgt ggaatgggtc tgtgggggta tttgaatggg aagcttttgc 120
ccggggaacc aaagctctca ttgatgaggt ggtgaaagcc acttctaggg gctgcatcac 180
catcataggt ggtggagaca ctgccacttg ctgtgccaaa tggaaacacgg aggataaagt 240
cagccatgtg agcactgggg gtggtgccag tttggagctc ctggaaggta aagtccttcc 300
tggggtggat gctctcagca atatttagta ctttcctgcc ttttagttcc tgtgcacagc 360
ccctaagtca                                     370

```

<210> 351

<211> 177

<212> DNA

<213> Homo sapiens

<400> 351

```

gggctgcatc accatcatag gtggtggaga cactgccact tgctgtgcca aatggaacac 60
ggaggataaa gtcagccatg tgagcactgg ggggtgggtgcc agtttgagc tcctggaagg 120
gaaagtcctt cctgggggtg atgctctcag caatatttag tactttcctg cctttta 177

```

<210> 352

<211> 204

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> 53, 55, 76, 86, 137

<223> n = A,T,C or G

<400> 352

```

atggctttta ctttccttaa ggtgctcaac aacatggaga ttgggcactt tcncnggttg 60
atgaagaagg aagccnagat ttgtcnaaga cctaattgtcc aaaagctgag aagaatggtg 120
tgaagattac cttgccntgt tgacttgtca ctgctgacaa gtttgatgag aatgcccaag 180
actggccag ccactggtgg cttc                                     204

```

<210> 353

<211> 489

<212> DNA

<213> Homo sapiens

<400> 353

```

cttttacctt ccttaagggtg ctcaggacat ggagattggc acttctctgt ttgatgaaga 60
gggagccaag attgtcaaag acctaattgtc caaagctgag aagaatggtg tgaagattac 120
cttgctgtgt gactttgtca ctgctgacaa gtttgatgag aatgccaaaga ctggccaagc 180
cactgtggct tctggcatac ctgctggctg gatgggcttg gactgtgggtc ctgaaagcag 240
caagaagtat gctgaggctg tcactcgggc taagcagatt gtgtggaatg gtcctgtggg 300
ggtatttgaa tgggaagctt ttgcccgggg aaccaaagct ctcatggatg aggtggtgaa 360
agccacttct aggggctgca tcaccatcat aggtggtgga gacactgcc a ttgctgtgc 420
caaatggaac acggaggata aagtcagcca tgtgagcact gggggtggtg ccagtttgga 480
gctcctgga                                     489

```

<210> 354
 <211> 885
 <212> DNA
 <213> Homo sapiens

<400> 354
 tttttttttt tcacggtttc aatggacact tttattgttt acttaatgga tcatcaattt 60
 tgtctcacta cctacaaatg gaatttcatac ttgtttccat gctgagtagt gaaacagtga 120
 caaagctaat cataataacc tacatcaaaa gagaactaag ctaacactgc tcaactttctt 180
 tttaacaggc aaaatataaa tatatgcact ctaaaatgca caatggttta gtcactaaaa 240
 aattcaaatg ggatcttgaa gaatgtatgc aaatccaggg tgcagtgaag atgagctgag 300
 atgctgtgca actgtttaag ggttcctggc actgcatctc ttggccacta gctgaatctt 360
 gacatggaag gtttttagcta atgcccaggg gaaatgcaaa aaatgctaata ttgacttagg 420
 gcctgtgcac aggaactaaa aggcaggaaa gtactaaata ttgctgagag catccacccc 480
 aggaaggact ttaccttcca ggagctccaa actggcacca cccccagtgc tcacatgggt 540
 gactttatcc tccgtgttcc atttggcaca gcaagtggca gtgtctccac cacctatgat 600
 ggtgatgcag cccctataaa gtggctttca ccacctcatc catgagagct ttggttcccc 660
 gggcaaaaagc ttccattcca aataccccca caggaccatt ccacacaatc tgcttaaccc 720
 gagtgcacgc ctacgcatac ttcttgctgg tttcaggacc acagtccaag ccccatccca 780
 ccagcaggta tgcaagaagg cccagtgggc ttgccagtct tggcatttct catcaacttg 840
 tcagcagtga caaagtcaac cggaaggaa tcttcacacc atctt 885

<210> 355
 <211> 434
 <212> DNA
 <213> Homo sapiens

<400> 355
 cggctgcgag aagacgacag aaggggggag tggttgctat accttgactt catttatatg 60
 aatttccact ttattaaata atagaaaaga aaatcccgtt gcttgacagta gaggatagag 120
 acattctatg cttacagaaa atatagccat gattgaaatc aaatagtaaa ggctgttctg 180
 gctttttatc ttcttagctc atcttaaata agcagtacac ttggatgcag tgcgtctgaa 240
 gtgctaatac gttgtaacaa tagcacaatc cgaacttagg atttggttct tctcttctgt 300
 gtttcgattt ttgatcaatt ctttaatttt ggaagcctat aatacagttt tctattcttg 360
 gagataaaaa tttaatggat cactgatatt ttagtcattc tgcttctcat ctaaatattt 420
 ccatattctg tatt 434

<210> 356
 <211> 318
 <212> DNA
 <213> Homo sapiens

<400> 356
 gggagtgggt gctatacctt gacttcattt atatgaattt ccactttatt aaataataga 60
 aaagaaaatc ccggtgcttg cagtagagtg ataggacatt ctatgcttac agaaaatata 120
 gccatgattg aaatcaaata gtaaaggctg ttctggcttt ttatcttctt agctcatctt 180
 aaataagcag tacacttgga tgcagtgcgt ctgaagtgtt aatcagttgt aacaatagca 240
 caaatcgaac ttaggatttg cttcttctct tctgtgttgc gatttttgat caattcttta 300
 attttggag cctataat 318

<210> 357
 <211> 231
 <212> DNA
 <213> Homo sapiens

<400> 357
 cggctgcgag aagacaacag aagggggctc ccgctcgga tctcgctccg gatctcgctc 60
 cgggtcccg agtgggtccc ggagaggaag ctttgacgcc acaaggaatt ctctctactc 120
 ttattcctac tcatttagca gtagttctat tgggcactat tagtcagttg ggagtgggtg 180
 ctataccttg acttcattta tatgaatttc cactttatta aataatagaa a 231

<210> 358
 <211> 446
 <212> DNA
 <213> Homo sapiens

<400> 358
 atttgctgta tgccgagaat ggaaaaattg gaccacctaa actggatatac agaaaggagg 60
 agaagcaaat catgattgac atatttcacc cttcagtttt tgtaaatgga gacgagcagg 120
 aagtcgatta tgatcccgaa actacctgtt acattagggt gtacaatgtg tatgtgagaa 180
 tgaacggaag tgagatccag tataaaatac tcacgcagaa ggaagatgat tgtgacgaga 240
 ttcagtgccca gtttagcgatt ccagtatcct cactgaattc tcagtactgt gtttcagcag 300
 aaggagtctt acatgtgtgg ggtgttacaa ctgaaaagtc aaaagaagtt tgtattacca 360
 ttttcaatag cagtataaaa ggttctcttt ggattccagt tgttgctgct ttactactct 420
 ttctagtgtc tagcctggtg ttcate 446

<210> 359
 <211> 209
 <212> DNA
 <213> Homo sapiens

<220>
 <221> misc_feature
 <222> 19, 185, 193
 <223> n = A,T,C or G

<400> 359
 gagaatttgc tgtatgccng agatggaaaa attggaccac ctaaactgga tatcagaaaag 60
 gaggagaagc aaatcatgat tgacatatat cacccttcaa gtttttgtaa atggagacga 120
 gcaggaagtc gattatgatc ccgaaactac ctgttacatt aggggtgtaca atgtgtatgt 180
 gagantgaac ggnagtgaga tccagtata 209

<210> 360
 <211> 521
 <212> DNA
 <213> Homo sapiens

<400> 360
 tgctgtcggt gactactgaa gaaatattcc tgacgtggtc ccgggcagcc atctgactcc 60
 aatagagaga gagagttctt cacctttaag tagtaaccag tctgaacctg gcagcatcgc 120
 tttaaactcg tatcactcca gaaattgttc tgagagtgtat cactccagaa atgggttttga 180
 tactgattcc agctgtctgg aatcacatag ctctttatct gactcagaat ttcccccaaa 240
 taataaaggt gaaataaaaa cagaaggaca agagctcata accgtaataa aagcccccaac 300
 ctcttttgggt tatgataaac cacatgtgct agtggatcta cttgtggatg atagcggtaa 360
 agagtcctttg attgggttata gaccaacaga agattccaaa gaattttcat gagatcagct 420
 aagttgcacc aactttgaag tctgattttc ctggacagtt ttctgcttta atttcatgaa 480
 aagattatga tctcagaaat tgtatcttag ttggtatcaa c 521

<210> 361
 <211> 522
 <212> DNA
 <213> Homo sapiens

<400> 361
 tggccctcga ggccaagaat tcggcactag gggagaggag cttgaatttc tgacacacat 60
 aacatgtaaa aagtatttgg catttcataa ggatttgggg tggggtaaac gcaagggttag 120
 tctgttttaa aaaatgtttt cattaacgag cacataactg gtgggtccta atgggaatac 180
 ttgacccagg cagaaactag aaaagtagca agtaggaaac ttccatttct ctcccctaaa 240
 caacccttta aggcactgtg agctggagac aggagaggtg ttgcccaacc tttgttcata 300
 tactcgggtga cgatgtagat gggctcctca gacaccactg catagagctg gaccagcttg 360
 tcgtgcttca gcttcttcat gatctgcgct tcctcaagga atgattcggg ggacattgtg 420
 cctgggttaa gagtctttat ggctactttt gtgtttccat tccaggtagg tacaacatc 480
 ccagaatatg aagtcaaac aaagatcttc tttgatgga aa 522

<210> 362
 <211> 421
 <212> DNA
 <213> Homo sapiens

<220>
 <221> misc_feature
 <222> 12, 331, 372
 <223> n = A,T,C or G

<400> 362
 ttaatgagtt anaaatctta atatagccat cttagccata accacaaata aactcatttt 60
 ttctgttaaa atacttgaca gagtccttgc aattgaatgt ctttgttcaa caaaaactgt 120
 attaagtgtt ttaaatttaa aatctaactt tatgcaaata gctgggtggc aaaacctttt 180
 tccatcaaaa gaagatcttt ggtttgactt catattctgg gatgtttgta ggtacctgga 240
 atggaaacac aaaagtagcc ataaagactc ttaaaccagg cacaatgtcc cccgaatcat 300
 tccttgagga agcgagatc atgaagaagc ngaagcacga caagctgggc cagctctatg 360
 gcagtgggtg cngaggagcc catctacatc gtcaccgagt atatgaacaa aggttgggca 420
 a 421

<210> 363
 <211> 503
 <212> DNA
 <213> Homo sapiens

<400> 363
 cagaaggggt ttccgaatgt tttagtttagc cttttgggtgg agccgccagc tgacaggaca 60
 tcttacaaga gaatttgcac atctctggaa gcttagcaat cttattgcac actgttcgct 120
 ggaagctttt tgaagagcac attctcctca gtgagctcat gaggttttca tttttattct 180
 tccttccaac gtgggtgctat ctctgaaacg agcgttagag tgccgcctta gacggaggca 240
 ggagtttcgt tagaaagcgg acgctgttct aaaaaaggct tcctgcagat ctgtctgggc 300
 tgtgatgacg aatattatga aatgtgcctt ttctgaagag attgtgttag ctccaaagct 360
 tttcctgtcg cagtgtttca gttctttatt ttcccttggt gatattgctgt gtgaaccgtc 420
 gtgtgagtggt ggtatgcctg atcacagatg gattttgtta taagcatcaa tgtgacactt 480
 gcaggacact acaacgtggg aca 503

<210> 364
 <211> 365
 <212> DNA
 <213> Homo sapiens

<400> 364
 ggccgcccctt tttttttttt ttgggggggga aaaaattttt ttttaaaaaa aaaaaaactt 60
 cccccctggg gaaaaaaaaa ggtttttttaa aaaaaaaacc aaacaaaatt ttcccgggcc 120
 ctttaggggt tttaaatttt cccccgggtt gaaccctttt taaaaaaaaa ggaatttttt 180
 tgggggggaaa taatggggga aaaacccaaa aaaaaggggg gttttttttt taaaaccctt 240
 ttttttttaa aaaaccttcc cccaggggaa aaattcccaa aaccttttaa aaaaaagggt 300
 ccgaaatttt taatccaaag gggaaaaacc ccccccccaa caaaaaaacc ccaaagggga 360
 aaaag 365

<210> 365
 <211> 680
 <212> DNA
 <213> Homo sapiens

<220>
 <221> misc_feature
 <222> 172, 173, 176, 186, 199, 200, 591, 625, 659, 670
 <223> n = A,T,C or G

<400> 365

```

aggacacaga caaggaactt gctgaaaggc caaccatttc aggatcagtc aaaggcagca 60
agcagataga ctcaaggtgt gtgaaagatg ttatacacca ggagctgcca cttcatgtcc 120
caaccagact gtgtctgtct gtgtctgcat gtaagagtga gggaggggaag gnnngnacta 180
caaganagtc ggagatgann cagcacacac acaattcccc agcccacgtg atgcttgtgt 240
tgaccagatg ttcttgagtc tggagcagac acccaggcca gaataacaga gctttcttag 300
ttggtgaaga cttaaacatc tgcctgaggt caggaggcaa tttgcctgcc ttgtacaaaa 360
gctcaggtga aagactgaga tgaatgtctt tctctccctt gcctcccacc agacttcctc 420
ctggaaaacg ctttggtaga tttggccagg agctttcttt tatgtaattg gataaataca 480
cacaccatac actatccaca gatatagcca agtagatttg ggtagaggat actatttcca 540
gaatagtgtt tagctcacct agggggatat gttgtatcac atttgcatat nccacatggg 600
gacataagct aattttttac agacncgatt ctgtcatgct gttaatagcc atgggttaanc 660
ccccattggn ggggcccgtg                                     680

```

<210> 366

<211> 570

<212> DNA

<213> Homo sapiens

<400> 366

```

taagctcggg attcggctcg agcggctcga gtcgaagaga aacacaagaa ggacatcagc 60
cagaacaagc gagccgtgag gcggctgcgc accgcctgcg agagggccaa gaggaccctg 120
tcgtccagca cccaggccag cctggagatc gactccctgt ttgagggcat cgacttctac 180
acgtccatca ccagggcgag gttcgaggag ctgtgctccg acctgttccg aagcacccctg 240
gagcccgtgg agaaggctct gcgcgacgcc aagctggaca aggccagat tcacgacctg 300
gtcctggtcg ggggctccac ccgcattccc aaggtgcaga agctgctgca ggactttctc 360
aacgggcgcg acctgaacaa gagcatcaac cccgacgagg ctgtggccta cggggcgggc 420
gtgcaggcgg ccatcctgat gggggacaag tccgagaacg tgcaggacct gctgtgctg 480
gacgtggctc ccctgtcgct ggggctggag acggccggag gcgtgatgac tgcctgatc 540
aagcgcaact ccaccatccc caccaagcag                                     570

```

<210> 367

<211> 454

<212> DNA

<213> Homo sapiens

<400> 367

```

gccgcccttt tttttttttt tttttttttt tttttttttg tttttttttt tttttcaaaa 60
aaaaaaaaatc ttttttagaaa aaaaaaacccc cccccaacaa aaaatggggg gggggggggg 120
ttttccctcc cgggggaagg agaaaaagcc gcagtaataa aaaggggggg aaccaaaaaa 180
tttttttttt ttttttaaaaa aggttttttt gggggccccc ccccccacaa aaaaaaaagg 240
tccccccctt ttttttcccc cttttttggg ggggaaaaaa aaaaaagggg ggggaaaaaa 300
acagaaaatt ttccccaaaa atttaaaaaa aaaagggggg ggggggggaa aaaaaaggtt 360
tttttaccct cctggggggg aaaaaaaaaa aatttggggc caccacaaaag gggggggggc 420
ccccacaaaa agggggtttt ttttaaaaaa aaaa                                     454

```

<210> 368

<211> 651

<212> DNA

<213> Homo sapiens

<400> 368

```

taagctcggg attcggctcg agtggctctt gttactctcg ggtctttcag gaggccaaaa 60
ggcagctcca gaagattgac aaatctgagg gccgcttcca tgtccagaac cttagccagg 120
tggagcagga tgggcggacg gggcatggac tccgcagatc ttccaagtgc tgcttgaagg 180
agcacaaaagc cctcaagacg ttaggcatac tcatgggcac tttcaccttc tgctggctgc 240
ccttcttcat cgtaaacatt gtgcatgtga tccaggataa cctcatccgt aaggaagttt 300
acatcctcct aaattggata ggctatgtca attctggttt caatcccctt atctactgcc 360
ggagcccaga tttcaggatt gccttccagg agcttctgtg cctgcgcagg tcttctttga 420
aggcctatgg gaatggctac tccagcaacg gcaacacagg ggagcagagt ggatatcacg 480
tggaacagga gaaagaaaat aaactgctgt gtgaagacct cccaggcacg gaagactttg 540
tgggcatca aggtactgtg cctagcgata acattgattc acaaggaggg aattgtagta 600
caaatgactc actgctgtaa agcagttttt ctacttttaa agaccccccc c 651

```

<210> 369
 <211> 280
 <212> DNA
 <213> Homo sapiens

<220>
 <221> misc_feature
 <222> 112
 <223> n = A,T,C or G

<400> 369
 tgggtcttcgt ctactccagg gtctttcagg aggccaaaag gcagctccag aagattgaca 60
 aatctgaggg ccgcttccat gtccagaacc ttagccagggt ggagcaggat gngcggacgg 120
 ggcatggact ccgcagatct tccaagttct gcttgaagga gcacaaagcc ctcaagacgt 180
 taggcatcat catgggcact ttcaccctct gctggctgcc cttcttcacg gttaacattg 240
 tgcattgtgat ccaggataac ctcatccgta agaagtttac 280

<210> 370
 <211> 418
 <212> DNA
 <213> Homo sapiens

<400> 370
 ggccgccttt tttttttttt ttttttcccg ggcttttttg ggaaaaaacc ccctttccca 60
 taataaaatt tttttggggg tttcccaatt tttttttcca atttcaaata atttttttcc 120
 aaaaaaaacc caaaccttg gggccttttt tttttttttt aaagggcctt tttacttttc 180
 cccaaggagg ccttggggaa ataaaaaaa cccggttggg gggcccaaaa aaaggggttg 240
 gcccccttga atccccatt ggtttggggg taataaaagg ccccccatgg gcccccttcc 300
 cccggggggg ggaaccccc ccgaagaacc ccccggggga aaccggggcc aaaaaaaaaa 360
 cccttttaaaa ttttaaaaaa cgggcccccc cctaaaaaaa ctttttttta aaaagggg 418

<210> 371
 <211> 292
 <212> DNA
 <213> Homo sapiens

<400> 371
 ttaggggtata agttgctgta aaatttgtgt aaatttgtat ccacacaaat tcagtctctg 60
 aatacacagt attcagagtc tctgatacac agtaattgtg acaatagggc taaatgttta 120
 aagaaatcaa aagaatctat tagatttttag aaaaacattt aaacttttta aaatacttat 180
 taataaaattt gtataagcca cttgtcttga aaactgtgca acttttttaa gtaaatattt 240
 aagcagactg gaaaagtgat gtattttcat agtgacctgt gtttcactta at 292

<210> 372
 <211> 415
 <212> DNA
 <213> Homo sapiens

<400> 372
 tccttattta ttttaacttca cccgagttcc tctgggtttc taagcagtta tgggtgatgac 60
 ttagcgtcaa gacatttgct gaactcagca cattcgggac caatatatag tgggtacatc 120
 aagtccatct gacaaaatgg ggcagaagag aaaggactca gtgtgtgatc cggtttcttt 180
 ttgctcgccc ctgttttttg tagaatctct tcatgcttga catacctacc agtattattc 240
 ccgacgacac atatacatat gagaatatac cttattttatt tttgtgtagg tgtctgcctt 300
 cacaaatgtc attgtctact cctagaagaa ccaaatacct caattttttg ttttgagtac 360
 tgtactatcc tgtaaatata tcttaagcag gtttgttttc agcactgatg gaaaa 415

<210> 373
 <211> 326
 <212> DNA
 <213> Homo sapiens

<400> 373

```

tccttatttta ttttaacttca cccgagttcc tctggggtttc taagcagtta tgggtgatgac 60
ttagcgtcaa gacatttgct gaactcagca cattcggggac caatatatag tgggtacatc 120
aagttcatct gacaaaatgg ggcagaagag aaaggactca gtgtgtgatc cggtttcttt 180
ttgctcgccc ctgttttttg tagaatctct tcatgcttga catacctacc agtattattc 240
ccgacgacac atatacatat gagaatatac cttattttatt tttgtgtagg ggtctgcctt 300
cacaaatgtc attgtctact cctaca 326

```

<210> 374

<211> 324

<212> DNA

<213> Homo sapiens

<400> 374

```

tccttatttta ttttaacttca cccgagttcc tctggggtttc taagcagtta tgggtgatgac 60
ttagcgtcaa gacatttgct gaactcagca cattcggggac caatatatag tgggtacatc 120
aagttcatct gacaaaatgg ggcagaagag aaaggactca gtgtgtgatc cggtttcttt 180
ttgctcgccc ctgttttttg tagaatcttt tcatgcttga catacctacc agtattattc 240
ccgacgacac atatacatat gagaatatac cttattttatt tttgagttagg tgtctgcctt 300
cacaaatggc attggctact ccag 324

```

<210> 375

<211> 466

<212> DNA

<213> Homo sapiens

<400> 375

```

taactctggg aggggctcga gagggctggt ccttattttat ttaacttcac cccgagttcct 60
ctgggttttct aagcagttat ggtgatgact tagcgtcaag acatttgctg aactcagcac 120
attcggggacc aatatatagt ggggtacatca agtccatctg acaaaaatggg gcagaagaga 180
aaggactcag tgtgtgatcc ggtttctttt tgctcgcccc tgttttttgt agaactctctt 240
catgcttgac atacctacca gtattattcc cgacgacaca tatacatatg agaataatacc 300
ttattttatt ttgtgtagg gtctgccttc acaaatgtca ttgtctactc ctagaagaac 360
caaataacctc aatttttggt tttgagtact gtactatcct gtaaataatat cttaagcagg 420
tttggttttca gcactgatgg aaaataccag tgttggggttt tttttt 466

```

<210> 376

<211> 324

<212> DNA

<213> Homo sapiens

<400> 376

```

tccttatttta ttttaacttca cccgagttcc tctggggtttc taagcagtta tgggtgatgac 60
ttagcgtcaa gacatttgct gaactcagca cattcggggac caatatatag tgggtacatc 120
aagttcatct gacaaaatgg ggcagaagag aaaggactca gtgtgtgatc cggtttcttt 180
ttgctcgccc ctgttttttg tagaatcttt tcatgcttga catacctacc agtattattc 240
ccgacgacac atatacatat gagaatatac cttattttatt tttgagttagg tgtctgcctt 300
cacaaatggc attggctact ccag 324

```

<210> 377

<211> 326

<212> DNA

<213> Homo sapiens

<400> 377

```

tccttatttta ttttaacttca cccgagttcc tctggggtttc taagcagtta tgggtgatgac 60
ttagcgtcaa gacatttgct gaactcagca cattcggggac caatatatag tgggtacatc 120
aagttcatct gacaaaatgg ggcagaagag aaaggactca gtgtgtgatc cggtttcttt 180
ttgctcgccc ctgttttttg tagaatctct tcatgcttga catacctacc agtattattc 240
ccgacgacac atatacatat gagaatatac cttattttatt tttgtgtagg ggtctgcctt 300
cacaaatgtc attgtctact cctaca 326

```


<210> 378
 <211> 494
 <212> DNA
 <213> Homo sapiens

<400> 378
 atgccccgca tagatgcgga cctcaagctc gacttcaagg atgtcctgct ccgacctaag 60
 cggagcagcc tcaagagccg agccgaggtg gatcttgaac gcaccttcac gtttcgaaat 120
 tcaaagcaga cctactcagg gattcccatc atcgtggcca acatggacac tgtgggcacg 180
 tttgagatgg cagccgtgat gtcacagcac tccatgttta cagcaattca taagcattac 240
 tccctggatg actggaagct ctttgccaca aatcacccag aatgcctgca gaatgtagcc 300
 gtgagttcag gcagtgggca gaatgatctg gaaaagatga ccagcatcct ggaagctgtg 360
 ccacaggtta agtttatttg cctggatgtg gccaatgggt attcaaaaca ttttgtggaa 420
 ttcgtgaaac ttgtccgtgc caaatttcct gaacacacca ttatggcagg gaacgtggtg 480
 acaggagaaa tgggt 494

<210> 379
 <211> 243
 <212> DNA
 <213> Homo sapiens

<400> 379
 gccgctgcac catgccccgc atagatgcgg acctcaagct cgacttcaag gatgtcctgc 60
 tccgacctaa gcggacagcc tcaagagccg agccgaggtg gatcttgaac gcaccttcac 120
 gtttcgaaat tcaaagcaga cctactcagg gattcccatc atcgtggcca acatggacac 180
 tgtgggcacg tttgagatgg cagccgtgat gtcacagcac tccatgttta cagcaattca 240
 taa. 243

<210> 380
 <211> 804
 <212> DNA
 <213> Homo sapiens

<400> 380
 gcaaatgttt gattaattct gtcatatgc acatctgaaa gcatgagaca cactccacag 60
 acagcacgca ctggagctgg tggggcagat gggcactcgc cgattaggta ttaatgtcaa 120
 taatacgtgc ataaagtgtc gataaaataa cttaagtgtt acaaaaacag acagtccacg 180
 gtggctgcag gcacatgcag gcgggactgg gtcagacact ccagggtgc acatgttcca 240
 gctggcctga gtccgacacg tcatagctgg ccttgtaact ggccaggatt ttcattgagg 300
 gccgtagctt gagccaccac tggtcttttg gaatcctgtg ctcaaaatcc gtttgcttct 360
 tcagctctgc cacaggtttg aaaaataacg tttcttttgc ttattcccag cacacaaatg 420
 gaatcatcgg tggtaaattt ttttcctctg ccccgggcct ccttgagttt tgcagtgatc 480
 cactccatag ctctggcaga gattttggtt ccaaagtctc tatcaaatgg agagggtgcc 540
 ccaccctgct gcatgtgacc cagcacgttc ttcctgcagt caaacacgcc tttgccctct 600
 tctgaataca gctggtaaat gaagtcggtg gtgtagtttt cactgcagct ctcatctctg 660
 agcacaaggc ctctctggat ggtggtcttc attttctccg tcagggtgctc cacgttggac 720
 tgcagatcct gatgtcgaag ggctcttcga aatgtatgcy gcatcagtcg ggccgcagcc 780
 ccccatgttg gcaggtagca cagt 804

<210> 381
 <211> 624
 <212> DNA
 <213> Homo sapiens

<220>
 <221> misc_feature
 <222> 514
 <223> n = A, T, C or G

<400> 381
 tggagttgta ggcaaatgtt taattaattc tgctcatatg cacatctgaa agcatgagac 60

```

acactccaca gacagcacgc actggggctg gtggggcaga tgggcactcg ccgattaggt 120
attaatgtca ataatacgtg cataaagtgc tgataaaata acttaagtgt tacaaaaaca 180
gacagtccac ggtggctgca ggcacatgca ggcgggactg ggtcagacac tccagggtg 240
cacatgttcc agctggcctg agtccgacac gtcatactg gccttgact tggccaggat 300
tttcatgagg ggccgtagct tgagccacca ctgttctttg ggaatcctgt gctcaaaatc 360
cgtttgcttc ttcagctctg ccacagggtg aaaaataacg tttcttttgc ttattcccag 420
cacacaaatg gaatcatcgg tggtaaattt ttttcctctg ccccgggcct ccttgagttt 480
tgagtgatc cactccatag ctctggcaga gatnttggtt ccaaagtttc tatcaaatgg 540
agaggtgccc caccctgctg atgtgacccc acacgttctt cctgagtcaa acacgccttt 600
gccctcttct gaatacaagc tgggt                                     624

```

<210> 382

<211> 507

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> 301, 460, 498

<223> n = A,T,C or G

<400> 382

```

ttttttggag tttaggaaa tgtttaattc tgctcatatg cacatctgaa agcatgagac 60
acactccaca agacagcacg cactggggct ggtggggcag atgggcactc gcgattaggt 120
attaatgtta ataatacgtg cataaagtgc tgataaaata acttaagtgt tacaaaaaca 180
gacagtccac ggtggctgca ggcacatgca ggcgggactg ggtcagacac tccagggtg 240
cacatgttcc agctggcctg agtcccgaca cgtcatagct ggccttgta tggccaggg 300
nttttcatga ggggccctag ctttgagcca ccacttgttc tttggggaat cctgtgcttc 360
aaaatcccg tttgcttctt tcagctcttc ccacagggtt gaaaaataac gttttctttt 420
tgcttatctt ccagcacaca aatgggattc atcggtgggg aatttttttc ctctgccccg 480
gggcttcttg agtttttnca gtgattc                                     507

```

<210> 383

<211> 224

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> 198, 219

<223> n = A,T,C or G

<400> 383

```

atcagatccc aaagaccaat tgcaacgtag ctgtcatcaa cgtgggggca cccggggctg 60
ggatgaacgc ggccgtacgc tcagctgtgc gcgtgggcat tgccgacggc acaggatgct 120
cgccatctat gatggtttga cggcttcgca agggccagat caaagaaatc ggctggacag 180
atgtcggggg ctggaccngc caaggaggct ccattcttng gaca                                     224

```

<210> 384

<211> 507

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> 301, 460, 498

<223> n = A,T,C or G

<400> 384

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ttttttggag tttaggaaa tgtttaattc tgctcatatg cacatctgaa agcatgagac 60
acactccaca agacagcacg cactggggct ggtggggcag atgggcactc gcgattaggt 120
attaatgtta ataatacgtg cataaagtgc tgataaaata acttaagtgt tacaaaaaca 180

```

```

gacagtccac ggtggctgca ggcacatgca ggcgggactg ggtcagacac tccagggctg 240
cacatgttcc agctggcctg agtcccagaca cgtcatagct ggccttgtag ttggccaggg 300
nttttcatga ggggccctag ctttgagcca ccacttgctt tttggggaat cctgtgcttc 360
aaaatcccgt tttgcttctt tcagctcttc ccacagggtt gaaaaataac gttttctttt 420
tgcttatttc ccagcacaca aatgggattc atcgggtggg aatttttttc ctctgccccg 480
gggcttcttg agtttttnca gtgattc 507

```

<210> 385

<211> 224

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> 198, 219

<223> n = A,T,C or G

<400> 385

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atcagatccc aaagaccaat tgcaacgtag ctgtcatcaa cgtgggggca cccgaggctg 60
ggatgaacgc ggccgtacgc tcagctgtgc gcgtgggcat tgccgacggc acaggatgct 120
cgccatctat gatggtttga cggcttcgca agggccagat caaagaaatc ggctggacag 180
atgtcggggg ctggaccngc caaggaggct ccattcttng gaca 224

```

<210> 386

<211> 232

<212> DNA

<213> Homo sapiens

<400> 386

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acgacagaag ggtacggctg cgagaagacg acagatgggt acggctgtga gaagacgact 60
gatgggaaca gctaaggact gctaaacccc actctgcata aactgaacgc aaatcagcca 120
ctttaattaa gctaagccct tactagacca atgggactta aaccacaaa cacttagtta 180
acagctaagc accctaatac actggcttca atgtacttct cccgccgtcg gg 232

```

<210> 387

<211> 339

<212> DNA

<213> Homo sapiens

<400> 387

```

tactggtttt ggagaacttg tctacaacca gggattgatt tttaaagatgt ctttttttat 60
tttacttttt ttttaagcacc aaattttgtt gttttttttt ttttctcct tccccacaaa 120
tcccttttaa aatatttttg ttaacccctt ttccaacggg ccgaggaaac ttaaaacccc 180
tttttctctg gcttggttcc tctttaattt ttaatttttc cccatcagtt taaaggtttt 240
ggcatacttg gcatcttttt tcaaaaggaa aacttttttt gccattcttt ggacttcccc 300
ttttttaaag gaaatggggg ggccaaaagg ggatttcaa 339

```

<210> 388

<211> 456

<212> DNA

<213> Homo sapiens

<400> 388

```

tttttttttt tttttttttt ttttaaccatc aaattcacag ctatttttctg ctttttagtgt 60
gtcacagaaa aattagaaca ccttaagcag gagtttaata gcattttttg taagcaaagt 120
tacattccat ctctaagtca aattggtcaa agcttctcca gtattttacaa aacatgatag 180
acaagatgct acacaaaacc attgcatctg aagattttgt tttcctttat tctcaaagac 240
gactggaaaa gaaagcatta tctgctgtaa tcaaaaacat accacagtat aaacagttac 300
cattccactt atcacagctt ggttgagttt agaattagtg ttttaaaaag tccaagatga 360
ctgcagtttt acaaaaatgg gcagggtgga aagttgcaaa cttcatgtgc ttctggatat 420
caagatttgt ttttatacaa tagtcacagt taaaaa 456

```

<210> 389
 <211> 490
 <212> DNA
 <213> Homo sapiens

<400> 389
 ttacattgaa tactacatat gtcgagggaa tgcagaaaga gttaaggaag gcaggttgct 60
 ctgctatgga ggccactctt cgttttccat gtactgcatg ctgtttgtgg cactttatct 120
 tcaagccagg atgaaggagg actgggcaag actcttacc cccacactgc aatttggtct 180
 tggtgcccgt tccatttatg tgggcctttc tgcagttgct gattataaac accactggag 240
 cgatgtgttg actggactca ttcagggagc tctggttgca atattagttg ctgtatatgt 300
 atcggatttc ttcaaagaaa gaacttcttt taaagaaaga aaagaggagg actctcatac 360
 aactctgcat gaaacaccaa caactgggaa tcaatcccg agcaatcacc agccttgaaa 420
 ggcagcaggg tgcccagggt aagctggcct gttttctaaa ggaaaatgat tgccacaagg 480
 caagaggatg 490

<210> 390
 <211> 334
 <212> DNA
 <213> Homo sapiens

<400> 390
 gaactcgggt gtggccactg cgcagaccag acttcgctcg tactcgtgcg cctcgtttcg 60
 cttttcctcc gcaaccatgt ctgacaaacc cgatatggct gagatcgaga aattcgataa 120
 gtcgaaactg aagaagacag agacgcaaga gaaaaatcca ctgccttcca aagaaacgat 180
 tgaacaggag aagcaagcag gcgaatcgta atgaggcggt cgccgccaat atgcactgta 240
 cattccacaa gcattgcctt cttattttac ttcttttagc tgtttaactt tgtaagatgc 300
 aaagagggtg gatcaagatt aatgactgt gctg 334

<210> 391
 <211> 377
 <212> DNA
 <213> Homo sapiens

<220>
 <221> misc_feature
 <222> 349
 <223> n = A,T,C or G

<400> 391
 gaactcgggt gtggccactg cgcagaccag acttcgctcg tactcgtgcg cctcgtttcg 60
 cttttcctcc gcaaccatgt ctgacaaacc cgatatggct gaggtcgaga aattcgataa 120
 gtcgaaactg aagaagacag agacgcaaga gaaaaatcca ctgccttcca aagaaacgat 180
 tgaacaggag aagcaagcag gcgaatcgta atgaggcggt cgccgccaat atgcactgta 240
 cattccacaa gcattgcctt cttattttac ttcttttagc tgtttaactt tgtaagacgc 300
 atagaggggt gatcaagttt aatgactgt gctgcccctt tcacatcana gaactactga 360
 caacgaaggc cgcgcct 377

<210> 392
 <211> 555
 <212> DNA
 <213> Homo sapiens

<400> 392
 ctgggtggtg gccactgcgc agaccagact tcgctcgtag tcgtgcgcct cgctttgctt 60
 ttctctcgca accatgtctg acaaaccgga tatggctgag atcgagaaat tcgataagtc 120
 gaaactgaag aagacagaga cgcaagagaa aaatccactg ccttccaaag aaacgattga 180
 acaggagaag caagcaggcg aatcgtaatg aggcgtgcgc cgccaatatg cactgtacat 240
 tccacaagca ttgccttctt attttacttc ttttagctgt ttaactttgt aagatgcaaa 300
 gaggttggtg caagttttaa tgactgtgct gcccctttca catcaaagaa ctactgacaa 360
 cgaaggccgc gcctgccttt cccatctgtc tatctatctg gctggcaggg aaggaaagaa 420
 cttgcatggt ggtgaaggaa gaagtggggt ggaagaagtg ggggtggagc acagtgaat 480

ctagagtaaa accaagctgg cccaaggtgt cctgcaggct gtaatgcagt ttaatcagag 540
tgccattttt ttttt 555

<210> 393

<211> 300

<212> DNA

<213> Homo sapiens

<400> 393

gctcaattgg actatgttga cctctatctt attcattctc caatgtctct aaagccagggt 60
gaggaacttt caccaacaga tgaaaatgga aaagtaatat ttgacatagt ggatctctgt 120
accacctggg aggccatgga gaagtgtgag gatgcatgat tggccaagtc cattgggggtg 180
tcaaaacttca accgcaggca gctggagatg atcctcaaca agccaggact caagtacaag 240
cctggctgca accaggtaga aagtcattcg tatttcaacc ggagtaaatt gctagaatcg 300

<210> 394

<211> 344

<212> DNA

<213> Homo sapiens

<400> 394

acagaaggggt acggctgcga gaagacgaca gaaggggtacg gctgcgagaa gacgacagaa 60
gggtacggct gcgagaagac gacagaagggt taaaacactg aactgacaat taacagccca 120
atatctacaa tcaaccgaca agtcattatt accctcactg tcaacccaac acaggcatgc 180
tcataaggaa aggttaaaaa aagtaaaagg aactcggcaa atcttaccac gcctgtttac 240
caaaaacatc acctgtagca tcaccagtat tagaggcacc gcctgcccag tgacacatgt 300
ttaacggccg cggtacccta accgtgcaaa ggtagcataa tcac 344

<210> 395

<211> 507

<212> DNA

<213> Homo sapiens

<400> 395

tgctcgggtcc ttccgaggaa gctaaggctg cggtgggggtg aggccctcac ttcatccggc 60
gactagcacc gcgccgggca gcgccagccc tacactcgcc cgcgccatgg cctctgtctc 120
cgagctcgcc tgcattctact cggccctcat tctgcacgac gatgaggtga cagtcacgga 180
ggataagatc aatgccctca ttaaagcagc cgggtgtaaat gttgagcctt tttggcctgg 240
cttgtttgca aaggccctgg ccaacgtcaa cattggggagc ctcatctgca atgtaggggc 300
cggtggacct gctccagcag ctggtgctgc accagcagga ggtcctgccc cctccactgc 360
tgctgctcca gttgaggaga agaaagtggg agcaaaagaaa gaagaatccg aggagtctga 420
tgatgacatg ggctttggtc tttttgacta aacctctttt ataacatgtt caataaaaaag 480
ctgaacttta aaaaaaaaaa aaaaaaa 507

<210> 396

<211> 488

<212> DNA

<213> Homo sapiens

<400> 396

gaggccctca cttcatccgg cgactagcac cgcgtccggc agcgccagcc ctacactcgc 60
ccgcgccatg gcctctgtct ccgagctcgc ctgcatctac tcggccctca ttctgcacga 120
cgatgaggtg acagtcacgg aggataagat caatgccctc attaaagcag ccgggtgtaaa 180
tgttgagcct ttttggcctg gcttgtttgc aaaggccctg gccaacgtca acattggggag 240
ctcatctgca aatgtagggg ccggaggacc tgctccagca gctggtgctg caccagcagg 300
aggctcctgcc ccctgcactg ctgctgctcc agttgaggag aagaaagtgg aagcatagaa 360
agaagaatcc gacgagtctg atgatgacat gggctatggt ctttttgact aaacctcttt 420
tataacatgt tcaataaaaa gctgaacttt aaaaagaaaa aaaaaaaact cgagcctcta 480
gaactata 488

<210> 397

<211> 180
 <212> DNA
 <213> Homo sapiens

<400> 397
 ctgCGttggg gtgaggccct cacttcatcc ggcgactagc accgcgtccg gcagcgccag 60
 ccctacactc gcccgcgcca tggcctctgt ctccgagctc gcctgcatct actcggccct 120
 cattctgcac gacgatgagg tgacagtcac ggaggataag atcaatgccc tcattaaagc 180

<210> 398
 <211> 491
 <212> DNA
 <213> Homo sapiens

<220>
 <221> misc_feature
 <222> 12, 154, 255, 348, 368, 402, 409, 450, 471
 <223> n = A,T,C or G

<400> 398
 tttttttttt tntttcactg ttcaagggtt attggggggt ttagttggta taacacttgg 60
 atagttgggt gcattgtttg tatgtagatc tttttacatt atatggtaat gtacactact 120
 gatatagttc acaaaataag atccttttga aganttatac acaagacatg atattggatt 180
 tatacactgg atcccaggga tgtgactcac tgggaaaaaa tgttggacta ggcattgtca 240
 gtgaaggagc caggnagtta tataacacac ggtaaaccac cacctggctc aaggggcaaa 300
 tgcagtacgt acagcattgg cagtgggtgc tcagagggtg cagaactntt tcacactaac 360
 cagttganga ctacacaaga ttaataccat ccagcatcag gntatagcnt gtggatttta 420
 caaaccattt cttatttcta actttcaggn gttgatgttt ttcccagtc ntcttaaaat 480
 ttttactgct t 491

<210> 399
 <211> 235
 <212> DNA
 <213> Homo sapiens

<400> 399
 tgattttctgt ggatcccagc ttggttccag gaattttgtg tgattggctt aaatccagtt 60
 ttcaatcttc gacagctggg ctggaacgtg aactcagtag ctgaacctgt ctgacccggt 120
 cacgttcttg gatcctcaga actctttgct cttgtcgggg tgggggtggg aactcacgtg 180
 gggagcgggtg gctgagaaaa tgtaaggatt ctggaataca tattccatgg gactt 235

<210> 400
 <211> 465
 <212> DNA
 <213> Homo sapiens

<400> 400
 tacggctgcg agaagacgac agaagggtac ggctgcgaga agacgacaga aggggtacggc 60
 tgcgagaaga cgacagaagg gtacggctgc gagaagacga cagaagggtg atttctgtgg 120
 atcccagctt ggttccagga attttgtgtg attggcttaa atccagtttt caatcttcga 180
 cagctgggct ggaacgtgaa ctccagtact gaacctgtct gaccgggtca cgttcttggg 240
 tcctcagaac tctttgctct tgtcggggtg ggggtgggaa ctacagtggg gacgggtggc 300
 tgagaaaaatg taaggattct ggaatacata ttccatggga ctttccttcc ctctcctgct 360
 tcctcttttc ctgctcccta acctttcgcc gaatggggca gcaccactga cgtttctggg 420
 cggccagtgc ggctgccagg ttctctgtact actgccttgt acttt 465

<210> 401
 <211> 243
 <212> DNA
 <213> Homo sapiens

<400> 401

```

tgattttctgt ggatcccagc ttggttccag gaattttgtg tgattggctt aaatccagtt 60
ttcaatcttc gacagctggg ctggaacgtg aactcagtag ctgaacctgt ctgacccggt 120
cacgttcttg gatcctcaca actctttgct cttgtcgggg tgggggtggg aactcacgtg 180
gggagcggtg gctgagaaaa tgtaaggatt ctggaatata tattccatgg gactttcctt 240
ccc 243

```

<210> 402

<211> 506

<212> DNA

<213> Homo sapiens

<400> 402

```

ttctagcatc ctcttaacgt gcagcaaaaag caggcgacaa aatctcctgg ctttacagac 60
aaaaatattt cagcaaacgt tgggcatcat gggttttgaa ggcttttagt ctgctttctg 120
cctctcctcc acagcccccac cctcccaccc ctgatacatg agccagtgat tattcttggt 180
caggggagaag atcattttaga tttgttttgc attccttaga atggagggca acattccaca 240
gctgcccctgg ctgtgatgag tgtccttgca ggggcccggag taggagcact ggggtggggg 300
cggaattggg gttactcgat gtaagggatt ccttggtgtt gtgttgagat ccagtgcagt 360
tgtgatttct gtggatccca gcttggttcc aggaattttg tgtgattggc ttaaattccag 420
ttttcaatct tcgacagctg ggctggaacg tgaactcagt agctgaacct gtctgacccg 480
gtcacgttct tggatcctca gaactc 506

```

<210> 403

<211> 390

<212> DNA

<213> Homo sapiens

<400> 403

```

gtagtcgcct ctctttcagc agttaccagc gggttttgga gtctctggat gattttttaca 60
ttcttagcag tggattgata ttgctgcaga ccacaaacag tgtgtttaat aaaaccctgc 120
taaagcaggt aataccagag actctcctgt cctggcaaaag agtccgtgtg gccaatatga 180
tggcagatag tggcaagagg tgggcagaca tcttttcaaa atacaactct ggcacctata 240
acaatcaata catggttctg gacctgaaga aagtaaagct gaaccacagt cttgacaaag 300
gcactctgta cattgtggag caaatccta catatgtaga atattctgaa caaactgatg 360
ttctacggaa aggatattgg ccctcctaca 390

```

<210> 404

<211> 372

<212> DNA

<213> Homo sapiens

<400> 404

```

aggagattca gaagcacaac cacagcaaga gcacctggct gatcctgcac cacaagggtgt 60
acgatttgac caaatctctg gaagagcatc ctgggtggga agaagtttta aggggaacaag 120
ctggagggtga cgctactgag aactttgagg atgtcgggca ctctacaaat gccagggaaa 180
tgtccaaaac attcatcatt ggggagctcc atccagatga cagaccaaag ttaaacaagc 240
ctccggaaac tcttatcact actattgatt ctagtccag ttggtggacc aactgggtga 300
tccctgccat ctctgcagtg gccgtcgcct tgatgtatcg cctatacatg gcagaggact 360
gaacacctcc tc 372

```

<210> 405

<211> 619

<212> DNA

<213> Homo sapiens

<400> 405

```

tcccgggtgg agctggctga gtcgcgcgct ctgctccacc cgacgggggt gtgtgtgctg 60
ggcctggctc ggggcgaacc gagatggcag agcagtcgga cgaggccgtg aagtactaca 120
ccctagagga gattcagaag cacaaccaca gcaagagcac ctggctgac ctgcaccaca 180
aggtgtacga tttgacaaa tttctggaag agcatcctgg tggggaagaa gttttaaggg 240
aacaagctgg aggtgacgct actgagaact ttgaggatgt cgggcactct acaaatgcca 300

```

```

gggaaatgtc caaaacattc atcattgggg agctccatcc agatgacaga ccaaagttaa 360
acaagcctcc ggaaactctt atcactacta ttgattctag ttccagttgg tggaccaact 420
gggtgatccc tgccatctct gcagtggccg tcgccttgat gtatcgccca tacatggcag 480
aggactgaac acctcctcag aagtcagcgc aggaagagcc tgctttggac acgggagaaa 540
agaagccatt gctaactact tcaactgaca gaaaccttca cttgaaaaca atgattttta 600
tatactctct tctttttct 619

```

<210> 406

<211> 499

<212> DNA

<213> Homo sapiens

<400> 406

```

taagctcgga attcggctcg agggctccag ctgagctcct gcttctactg aggacatacc 60
tcccagatga ggtggggccc ccaaccccat tccctgagcc tggagcagag cccctctctca 120
ctgtgggctt gctcaaagcc ctgctggagc agactggggc tcaaggatgg ctgtcggggc 180
cagttctaag cccatatgag gacatcctat gggaccccag cactccacc cagactccac 240
ctcgggacct atgactaccc ttcaggcatc agaacactca gggcctggag gcttgcttg 300
gactggaggc ttgcttggac agttcctctg tgtcactgac acaggaaatc atttctagga 360
cacagtgatc agggaagggt gcctgggact tggagggtcc catgtatgga cctgtgtatg 420
caatactgtt ctgtcatctg gagctatatt taagatgtgt gtgttaaata tatacatagt 480
ttaatatata aaaaaaaaaa 499

```

<210> 407

<211> 229

<212> DNA

<213> Homo sapiens

<400> 407

```

ggctccagct gagctcctgc ttctactgag gacatacctc ccagatgagg tggggccccc 60
aaccaccatt cctgagcctg gagcagagcc ccctctcact gtgggcttgc tcaaagccct 120
gctggagcag actggggctc aaggatggct gtggggccca gttctaagcc catatgagga 180
catectatgg gaccccagca ctccacccc gactccacct cgggaccta 229

```

<210> 408

<211> 467

<212> DNA

<213> Homo sapiens

<400> 408

```

ggaagtctct cgctggtcgg cggagtatca agtggccatg gggagcctca gcggtctgct 60
cctggcagca ggaagctgtt ttaggttatg tgaaagagat gttggcctca tctctaaggc 120
ttaccagaag ctctgatttg aagagaataa atggattttg cacaaaacca caggaaagtc 180
ccggagctcc atccgcactc tacaacagag tgcctttaca caaacctacg gattggcaga 240
aaaagatcct catatgggtc ggtcgcttca aaaaggaaga tgaaatccca gagactgtct 300
cgttggagat gcttgatgct gcaaagaaca agatgcgagt gaagatcagc tatctaata 360
ttgccctgac ggtggttaga tgcatttca tggttattga gggcaagaag gctgcccaaa 420
gacacgagac ttaacaagc ttgaacttat aaaagaaagc tcgtctg 467

```

<210> 409

<211> 338

<212> DNA

<213> Homo sapiens

<400> 409

```

ggaagtctct cgctggtcgg cggagtagca agtggccatg gggagcctca gcggtctgct 60
cctggcagca ggaagctgtt ttaggttatg tgaaagagat gtttcctcat ctctaaggct 120
taccagaagc tctgatttga agagaataaa tggattttgc acaaaaccac aggaaagtcc 180
cggagctcca tcccgcactt acaacagagt gcctttacac aaacctacgg attggcagaa 240
aaagatcctc atatggtcag gtcgcttcaa aaaggaagat gaaatcccag agactgtctc 300
gttgagatg cttgatgctg cagagatcaa gatgcgag 338

```


<210> 410
 <211> 601
 <212> DNA
 <213> Homo sapiens

<400> 410
 tttgcacgat gccttccaca tcccacggcg ctgctgctgg gggcagattg gcctggggag 60
 gcagcacttg ctctccagct catctgggtt gcttttcccc gcagtggata tcacaggcta 120
 aagggggggg cagtccccac catatttgag tctttctcca agttgcgccg gacaaccaag 180
 accaaaggac acagttaccc acctggcccc tctgaagtca gccggctcag acgatgcagg 240
 aagcgtgct ccgaggggcg agggcccaca actccatttt ctccacctcc acctgctgat 300
 gtcacctgct ttcctgtgga agaggcctca gcacctgcca ctttgccggc ctccccagct 360
 gggaggctgg agcctggcct tagcagcccc ttttcagacc tactggggcc cttgggtgcc 420
 caggcagatg aagcaggctg cagcgcccag ccttcaccag agcggcagcc ctccccctc 480
 gaaccacggc cagtctcccc ctacgcgtat atgctgcgcc tgccccacc cgccggagcc 540
 tacatccaga atgaacacag ctaccagggtg ggcagcgctt tactctggaa gcggcgagcc 600
 g 601

<210> 411
 <211> 52
 <212> DNA
 <213> Homo sapiens

<400> 411
 gccccttggg tgcccaggca gatgaagcag gctgcagcgc ccagccttca cc 52

<210> 412
 <211> 525
 <212> DNA
 <213> Homo sapiens

<400> 412
 cgtttcgggt tctagggttg ttacgaagct gcaggagcga gatggagggtg gacgcaccgg 60
 gtgttgatgg tcgagatggt ctccgggagc ggcgaggctt tagcgaggga gggaggcaga 120
 acttcgatgt gaggcctcag tctggggcaa atgggcttcc caaacactcc tactgggttg 180
 acctctggct tttcatcctt ttcgatgtgg tgggtgttct ctttggtgat tttttgccat 240
 gacttggtcg ctgatatcta aattaagaag ttggttcttg agtgaattct gaaaatggct 300
 acaaacttct tgaataaaga agacaggact ctcaatagaa gaatttcaca tctccaaggg 360
 acccttcctt tcattttaca ctttggtact aatttgcaga actctattaa ttgggtagga 420
 tttcacccat tctagctaa gttcttaaaa ttaaacctt tggttcgtgt ttaaaaactt 480
 tcaaacatct gatggcttta caggggctga atataaaagc atttg 525

<210> 413
 <211> 604
 <212> DNA
 <213> Homo sapiens

<220>
 <221> misc_feature
 <222> 12, 14, 18, 20, 24, 27, 29, 31, 33, 35, 54, 594, 595
 <223> n = A,T,C or G

<400> 413
 ttcgaaccca tncntttncn atcnganana ngntnctagt tcttctgaag accncatcga 60
 ttcgtttcgg tttctagggt tggtacgaag ctgcaggagc gagatggagg tggacgcacc 120
 ggggtgtgat ggtcgagatg gtctccggga gcggcgaggc tttagcgagg gaggggaggca 180
 gaacttcgat gtgaggcctc agtctggggc aaatgggctt cccaaacact cctactgggt 240
 ggacctctgg cttttcatcc ttttcgatgt ggtggtgttt ctctttgtgt attttttgcc 300
 atgacttggt cgctgatatc taaattaaga agttggttct tgagtgaatt ctgaaaatgg 360
 ctacaaactt cttgaataaa gaagacagga ctctcaatag aagaatttca catctccaag 420
 ggacccttcc tttcatttta cactttgtta ctaatttgca gaactctatt aattgggtag 480
 gatttcaccc attcctagct aagttcttaa aattaaacc tttggttcgt gtttaaaaac 540

tttcaaacat ctgatggctt tacaggggct gaatataaaa gcatttgtag ttannaaaaa 600
aaaa 604

<210> 414

<211> 285

<212> DNA

<213> Homo sapiens

<400> 414

ctctaacgtg ggcaacagag accctgtctc aaaaagaaaa tattcctggt agccctaaag 60
gctttacatg aggaatggta gaagtgggtc tttgtttaaa ttagttgcat tcagcatata 120
tgaattgtct taaatatttt ggggatactc cccgccttt taaacagggc ataagatctg 180
gtaaactctc tgtatatctt cctacctttc aaaatcggtc ttagggttag tcaagtctgg 240
aatataattg ctgactataa agtttagcaat tatgctttta ggtga 285

<210> 415

<211> 241

<212> DNA

<213> Homo sapiens

<400> 415

atttacactt gatggctaataa aaagatggac agctaattgac agaattattt aatcgattag 60
aaagtcagca tcatttccag atagaaaagg ctctagttga gaaacttcag caggattttg 120
tagctgactg gtgctctgag ggagagtgcc tagcagctat taactccacc tataatactt 180
cagggtatat tttggatcca cacactgctg ttgcaaaagt ggttgacagat aggggtgcaag 240
a 241

<210> 416

<211> 315

<212> DNA

<213> Homo sapiens

<400> 416

cggtctctgg aagagggggg gttgcggcag atccctgtag tgggcttcgt gctgaattgg 60
ttttctccgg tccaggcttc acagtaggga agaactttta acttgacagc aggcctctctg 120
gagtcacacg aaccatataa tgtctacaaa gcacaagggtg caggagtcac gctgcctcca 180
acgccctcgg gcagtcgcac caagcagagg cttccaggcc agaagccttt taaaagggtcc 240
ctgcgagggt cagatgcttt gagtgagacc agctcagtcg gtcattattga agacttagaa 300
aagggtggagc gccta 315

<210> 417

<211> 164

<212> DNA

<213> Homo sapiens

<400> 417

tggatccccc gggctgcagg aattcgaatt ctgtgtgtgt gtgtgtgtat gaatgggtata 60
tttattacat tatttagaaa gagaatgagt gtgttatgag gataatgtta tatacagtct 120
aagtggatgt ttctgtttgg cacagaatgt aggatttctg aaac 164

<210> 418

<211> 206

<212> DNA

<213> Homo sapiens

<400> 418

tatattttatt acattatttt gaaagagaat tagtgtgtta tgtggataat gttatatata 60
gccaaagtgg atgtttctgt ttggcaagga aggtaggatt tctgaaactc aggccttaac 120
caatagggtg gaagacaaga ccaattgaag agttaggaaa tgtgagtttt tgttacttct 180
gttattccag tcttggtttc attgtc 206

<210> 419

<211> 238
 <212> DNA
 <213> Homo sapiens

<220>
 <221> misc_feature
 <222> 159, 227
 <223> n = A,T,C or G

<400> 419
 agcagtgtac ataatatcc agtaggaaac tgcttccaag ttttaagcatg agctcccca 60
 actggagaaa acatatcttg ctattctgag acaacaatca gaatacagac tttggattcc 120
 aggtcacagt ttgcttttta gacaaggtaa agcaaagana gccacattgt gccatcttca 180
 gctccagtgg ctttagcagt gactgtttga cataaaacat gtaaganttg cttgtttg 238

<210> 420
 <211> 504
 <212> DNA
 <213> Homo sapiens

<400> 420
 cggcgtgctt gctgctggag ggtgatggcc ctgcaaggct gtgggctccg acctcaccgg 60
 gagtgcagac cgagagggtc gccgaagagc gaggttcttg gcgagcgtg aacgccggcc 120
 ccaagcacc cgggtcttta cacagtcgc gtccacagac tctgacgaag acgtggatct 180
 gctctcgctt tagctgctcg cggctctcca gatcatgtcc gcgactcctg cgactccgctg 240
 cggaaaaaaa agtttgccag gcgtggactc aatgacctt ccaagctgtg cgccctcgctg 300
 cctggaccgg gtctgagcgc ggctgccag gttgacctt ctgcgggagg gctttctcta 360
 cgtgctgttg tctactggg tttttgtcg agccccacgc cctccggcct ctgattcctg 420
 gaagaaaggg ttggtcccct cagcaccccc agcatcccg aaaatgggga gcaaggctct 480
 gccagcgccc atcccgtcc accc 504

<210> 421
 <211> 814
 <212> DNA
 <213> Homo sapiens

<220>
 <221> misc_feature
 <222> 38, 93, 94, 95, 422, 440, 467, 474, 508, 519, 529, 535, 554,
 557, 561, 565, 584, 594, 604, 619, 641, 655, 674, 679, 690,
 695, 702, 704, 706, 712, 716, 724, 734, 737, 740, 743, 780,
 781, 808, 813
 <223> n = A,T,C or G

<400> 421
 cggggacgga gctcggcgtg cttgctgctg gagggttntg gccctgcaag gctgtgggct 60
 ccgacctcac cgggagtcga cagcgagagg ttinncaag agcgagggtc tgggcgagcg 120
 ctgaacgccc gccccaagca ccccggtct ttacacagtc cgcgtccaca gactctgacg 180
 aagacgtgga tctgctctcg ctttagctgc tcgcggctct ccagatcatg tccgcgactc 240
 ctgcgactcc gcgcggaaaa aaaagtttgc caggcgtgga ctcaatgacc tttccaagct 300
 gtgcgcctcg ctgcctggac cgggtctgag cgcggctgcc cagggtgacc ttttctgcgg 360
 aagggttttc tctacgtgct gttgctcatg ggtttttgtc ggagcccca cgccttccg 420
 gntttttgat tcctggaaan aaaagggtt gggtccctt caagcancct caancattcc 480
 ccgggaaaaa atgggggagc caaagggnnt ttggccaang gccccaatnc ccggnntcaa 540
 cccgttgggt tggnaanttt naccnaaatt aacttcttt cctncaaggc ccngggaaaa 600
 aacnttttcc cgggccacng ggggggaacc aaccttgcaa nggggccttg taccnggtct 660
 tcaaacggcg ggtnccaana acccttgccn ccatngaaac cnantnggaa cncctngggg 720
 gttnttcccc aatngngngn ccnaaaaaac aaccccggtt ccaaccattt aaggggaaaa 780
 nggcgggggg gccccaaggg cccttttngg acnt 814

<210> 422
 <211> 375

<212> DNA

<213> Homo sapiens

<400> 422

```
ctgacgaaga cgtggatctg ctctcgcttt agctgctcgc ggtcctccag atcatgtccg 60
cgactcctgc gactccgcgc ggaaaaaaa gtttgccagg cgtggactca atgacctttc 120
caagctgtgc gcctcgctgc ctggaccggg tctgagcgcg gctgcccagg ttgacctttc 180
tgcgggaggg ctttctctac gtgctgttgt ctactgggt ttttgtcggg gccccacgcc 240
ctccggcctc tgattcctgg aagaaagggt tggccccctc agcaccacca gcatcccgga 300
aaatggggag caaggctctg cagcgcccat cccgctccac cgtcgctgca gctcccaatt 360
actcttctgc aggcg                                     375
```

<210> 423

<211> 405

<212> DNA

<213> Homo sapiens

<400> 423

```
ggggacggag ctccggcgtgc ttgctgctgg aggggtgatgg ccctgcaagg ctgtgggctc 60
cgacctcacc gggagtcgac agcgagaggt tgcgcaaga gcgaggttct gggcgagcgc 120
tgaacgccgg ccccaagcac cccgggtctt tacacagtcg gcgtccacag actctgacga 180
agacgtggat ctgctctcgc tttagctgct cgcggtcctc cagatcatgt ccgcgactcc 240
tgcgactccg cgcggaaaaa aaagtgtgcc aggcgtggac tcaatgacct ttccaagctg 300
tgcgcctcgc tgccctggacc gggctctgagc gcggctgccc aggttgacct ttctgcgga 360
gggctttctc tacgtgctgt tgtctactg ggtttttgtc ggacc                                     405
```

<210> 424

<211> 139

<212> DNA

<213> Homo sapiens

<400> 424

```
ctcgtgttca gctgtcagaa taacagccaa taaaaactac aggagcaaaa cctctcagga 60
agggtgcttta aaaaagatgc atgaggaaga acaccatcaa caaatgtcca tcttacaact 120
gcaactgata caaatgaat                                     139
```

<210> 425

<211> 273

<212> DNA

<213> Homo sapiens

<400> 425

```
ttctggctgg gaagcgcgat tgtggcttta aaccaccatc atggtctagc aaagaggcaa 60
agaccaagac caccāagaag cgccctcagc gtgcaācatc caatgtgttt gccatgtttg 120
accagtcaca gattcaggag ttcaaagagg ctttcaacat gattgatcag aacagagatg 180
gcttcatcga caaggaagat ttgcatgata tgcttgcttc tctagggaag aatcccactg 240
atgcatacct tgatgccatg atgaatgagg ccc                                     273
```

<210> 426

<211> 56

<212> DNA

<213> Homo sapiens

<400> 426

```
gggaaccgcc attctgcctg ggaaccgcca ttctggccgg gaaccgcat tatgac 56
```

<210> 427

<211> 365

<212> DNA

<213> Homo sapiens

<400> 427

```

ggcgcatctct tacctgtcgg ggtgcggcga gtgtctcacc tctctgcact tccaaggact 60
cttgtcatct gccttaggcg ggaaatgctg ttgctggatt gcaaccccgga ggtggatggg 120
ctgaagcatt tgctggagac aggggcctcg gtcaacgcac ccccgatcc ctgcaagcag 180
tcgcctgtcc acttagccgc aggaagcggc cttgcttgct ttcttctctg gcagctgcaa 240
acgggcgctg acctcaacca gcaggatggt ttaggagaag ctccactaca caaggcagca 300
aaagttggaa gcctggagtg cctaagcctg cttgtagcca gtgatgccca aattgattta 360
tgtag 365

```

<210> 428
 <211> 119
 <212> DNA
 <213> Homo sapiens

```

<400> 428
gagcgggtggc tgagaaatgt aaggattctg gaatacatat tccatgggac tttccttccc 60
tctcctgctt cctcttttcc tgctccctaa cctttcgccg aatggggcag caccactga 119

```

<210> 429
 <211> 421
 <212> DNA
 <213> Homo sapiens

<220>
 <221> misc_feature
 <222> 130, 185, 246, 256, 336, 361, 385, 412
 <223> n = A,T,C or G

```

<400> 429
tttttttttt tttttttgga aataagtcaa agcattgttt atttatgaca tatttacata 60
tttacaaaac tgattttact caatacatca tcctgcgtaa tatcataaaa tgaacaccat 120
atcctgggan taaaaatcca tatttcttaa taatttatgt atagcccaac ttttagaaca 180
tagantatta tcaatttggc ttcccaaact acaaagtcct gtttataatt ttttctagcc 240
aaggancaga gtaggntcaa caggcatatt aaagtaattt agttaaccct gaggtaatta 300
ctaacttggc ataattttgg aatgggggat atatanacaca ctttccatct ggcacttagg 360
ntacttatta ctattcacac tacnnttttg gtatttatcc acctcaattt tncaacttcc 420
t 421

```

<210> 430
 <211> 481
 <212> DNA
 <213> Homo sapiens

```

<400> 430
gggtagccgc ttttcgtcga ctcttaccgg ttggctgggc cagctgcgcc gcggetcaca 60
gctgacgatg ggggacccca gcaagcagga catcttgacc atcttcaagc gcctccgctc 120
ggtgccact aacaagggtg gttttgattg ttggtgcaaaa aaatcccagc tgggcaagca 180
taacctatgg agtggtcctt tgcattgatt gctcagggtc ccaccggtca cttgggtgtc 240
acttgagttt tattcgatct acagagttgg attccagctg gtcattggtt cagttgcgat 300
gcatgcaagt cggaggaaac gctagtgcac cttccttttt tcatcaacat ggggtgtcca 360
ccaatgacac caatgccaaag tacaacagtc gtgctgctca gctctatagg gagaaaatca 420
aatcgctcgc ctctcaagca acacggaagc atggcactga tctgtggctt gatagttgtg 480
t 481

```

<210> 431
 <211> 136
 <212> DNA
 <213> Homo sapiens

```

<400> 431
ggggtaagtt tagaaatacg gctgggcatg tccagccctg accacggcca gctctggagg 60
gctgtccttt ggctgtaccc acttggaaga gaaagaaaaa gaaaaaaaaa aaaaaaaaaa 120
aaaatttttt tttttt 136

```

<210> 432
 <211> 578
 <212> DNA
 <213> Homo sapiens

<400> 432
 aaacaacaaa caccagaaaa attacctata ccaatgatag caaaaaacct tatgtgtgaa 60
 ctcgatgaag actgtgaaaa gaatagtaag agggactact taagttctag ttttctatgt 120
 tctgatgatg atagagcttc taaaaatatt tctatgaact ctgattcatc ttttcctgga 180
 atttctataa tggaaagtcc attagaaagt cagcccttag attcagatag aagcattaaa 240
 gaatcctctt ttgaagaatc aaatattgaa gatccactta ttgtaacacc agattgccaa 300
 gaaaagacct caccaaaagg tgtcgagaac cctgctgtac aagagagtaa ccaaaaaatg 360
 ttaggtcctc ctttggaggt gctgaaaacg ttagcctcta aaagaaatgc tgttgctttt 420
 cgaagtttta acagtcatat taatgcatcc aataactcag aaccatccag aatgaacatg 480
 acttcttttag atgccaatgg atatttcgtg tgcctacagt ggttcataac ccattggctat 540
 aaccctact caaaaaagaa gatcctgtat gccacatc 578

<210> 433
 <211> 229
 <212> DNA
 <213> Homo sapiens

<220>
 <221> misc_feature
 <222> 35, 37
 <223> n = A,T,C or G

<400> 433
 gcctagggtgc ccaggctatg atgagtctgc ttttnangga ggtagggaat gacatcttcc 60
 ttggacccaa agcttaaaag taatgtatgc tttgctgacc actgtttgtt aggccttaaa 120
 caacattcac tgtggtggtg tcaggcacac tgctatgtgc atcaattatt tttttgcttt 180
 ccaaacagaa tctctggggc acaagtttta cactcaagct aagtataac 229

<210> 434
 <211> 503
 <212> DNA
 <213> Homo sapiens

<400> 434
 tggtacgcct gcaggtagcg gtccggaatt cccgggtcga cccacgcgtc cggcgctcatg 60
 gacgtgacct ggttcccatc tactcctttg gagagaatga agtgatacag caggtagatct 120
 tcgaggaggg ctcttggggc cgatgggtcc agaagaagtt ccagaaatac attgggttcg 180
 ccccatgcat ctccatggt cgaggcctct tctcctccga cacctggggg ctggtgccct 240
 actccaagcc catcaccact gttgtgggag agcccatcac catccccaag ctggagcacc 300
 caaccagca agacatcgac ctgtaccaca ccattgtacat ggaggcctg gtgaagctct 360
 tcgacaagca caagaccaag ttcggcctcc cggagactga ggtcctggag gtgaactgag 420
 ccagccttcg gggccaattc cctggaggaa ccagctgcaa atcacttttt tgctctgtaa 480
 atttggaagt gtcattgggtg tct 503

<210> 435
 <211> 248
 <212> DNA
 <213> Homo sapiens

<400> 435
 gcgtcatgga gctgacctgg ttcccatcta ctccctttgga gagaatgaag tgtacaagca 60
 ggtgatcttc gaggagggtc cctggggccg atgggtccag aagaagttcc agaaatacat 120
 tggtttcgcc ccattgcatct tccatgggtc aggcctcttc tcctccgaca cctgggggct 180
 ggtgcctact ccaagcccat caccactgtt gtgggagagc ccattcaccat ccccaagctg 240
 gagacca 248

<210> 436
 <211> 457
 <212> DNA
 <213> Homo sapiens

<400> 436
 atcttgtctc ttttcacgt gatggtgtga tgetgacgag aatatcttat gctttcttca 60
 gcctgttgca atctgagcca atgattttct ttgactgat cctttctact ctggagagaa 120
 gctcttttga cacagatcct gccccgttta atagactcca gctgctggca ctgccttctg 180
 agttctttca cttccgaatt cttatcgtcc tgcagcccca ccacagtcaa tgactaagtt 240
 cctctggact ttacatgga tcgtaataga caacttcac ctgtttttct taccagaccc 300
 taaaatgtgc ctccaagaca gtcgtgggaa cagtatggag ccagcagcag aagccactca 360
 cgaaccaatg gaggagaaca actcagaaac agaccaagt caatctaagg ttttaactttt 420
 ataagtcttt caagagagtc caactgtgta gtaagca 457

<210> 437
 <211> 589
 <212> DNA
 <213> Homo sapiens

<400> 437
 gcttccaggt ctccctccag catccacaca agtacctgct ccactacctg gtttccctcc 60
 agaactggct gaaccgccac agctggcagc ggaccctgt tgccgtcacc gcctgggccc 120
 tgctgcggga cagctaccat ggggcgtgt gcctccgctt ccaggcccag cacatcgccg 180
 tggcgggtgt ctacctggcc ctgcaggtct acggagttga ggtgcccgcg gaggtcgagg 240
 ctgagaagcc gtggtggcag gtgtttaatg acgaccttac caagccaatc attgataata 300
 ttgtgtctga tctcattcag atttatacca tggacacaga gatcccctaa ggtcctggcc 360
 caggcctgcc caaagagaag cccaggatgg tcggctgcct ggggacattg tcaccacgtc 420
 gccatgacgg ctggtcccca caggaccagc tgggaggact ggttgtgctg ctggagaagg 480
 gctggagaag gcaatggcat gctgccgctt tgccagtcce taaaagtgcg ggtgcagggtg 540
 atggtgggag ccgcgcctcc agcgggcagc ccgggagtg actgtgtgc 589

<210> 438
 <211> 241
 <212> DNA
 <213> Homo sapiens

<400> 438
 cgcttccagg tctccttcca gcatccacac aagtacctgc tccactacct gggttccctc 60
 cagaactggc tgaaccgcca cagctggcag cggaccctgt ttgccgtcac cgctggggcc 120
 ctgctgcggg acagctacca tggggcgctg tgctccgct tccaggccca gcacatcgcc 180
 gtggcgggtg tctacctggc cctgcaggtc tacggagttg aggtgcccgc cgaggtcgag 240
 g 241

<210> 439
 <211> 221
 <212> DNA
 <213> Homo sapiens

<400> 439
 ttcagctctg caaacactgt cacatccttt cctggaagg cactgaccat ccgtgcactg 60
 ccaataaccc agagagctgc tccgtttcac ttccaccca ggactttatc aacttgttca 120
 agttctgaat ccagcacat gacaacactt cagaagggtc cccctgctga ctggagagct 180
 gggaaatagg catttgga cttcatttgt aaatagtgt c 221

<210> 440
 <211> 228
 <212> DNA
 <213> Homo sapiens

<220>
 <221> misc_feature

<222> 191

<223> n = A,T,C or G

<400> 440

```

gagctttctt aataaccgta cttctcāaaa tcagagtttt actgtttcaa taaatgttca 60
ccctagattg taagtttttt gttgttgagc cctagatttt tttctactag tgtaaactctg 120
tattccctcc aagtatggtg ataaggggac tgagtcttat ttacatttgt acaatcacta 180
ctttacctgt ngatatttgcā gtaagtcttt tgagccctat taaacctg 228

```

<210> 441

<211> 531

<212> DNA

<213> Homo sapiens

<400> 441

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tttcttaata accgtacttc tcaaaatcag agttttactg tttcaataaa tgttcaccct 60
agattgtaag ttttttggtg ttgagcccta gatttttttc tactagtgtā aatctgtatt 120
ccctccaagt atggtgataa ggggactgag tcttattttac atttgtacaa tcactacttt 180
acctgttgta tttgcagtaa gtctttttgag ccctattāaa cctgtcaatt ttcttgctct 240
gtcagāāaac tgagattttg gctcaāāaat ggatgttatt acaāāagggg aacaatatag 300
atgtcttagt acaāāgāāāā tgāāatgtāā gaggagattg tctggagttc aggggataga 360
gtgtcaagtc ttāāatggtt acatcttttt gctaagtgtt actcagaata tagttacāāā 420
tatggtactt āāatatctag ctgāāatttg tttgtcccat gagcttctca catgagtcta 480
ctgggcaatt ttatgtgagt tttggtcāāā attggtāatc tcttttatct t 531

```

<210> 442

<211> 147

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<222> 112

<223> n = A,T,C or G

<400> 442

```

aacttggttac ccaataacaa tttāatgtta aatttggctt tcttctgtgt cccagcctct 60
taaattaata gatgggcctt tccattatca ttatgaccgg acattgtāāā gnacttaagg 120
taacaccāag ttttctatta cttgccc 147

```

<210> 443

<211> 518

<212> DNA

<213> Homo sapiens

<400> 443

```

acctgaagaa tattagaaga aattgtgcac cctccacāāā acatacāāag tttaāāagtt 60
tgatctttt tctcagcagg tatcagttgt āāāatāgāā ttaggggcca āāatgcaāāā 120
cgāāāatga atcatctaca tgtagttagt aatttctagt ttgaactgtā attgaatatt 180
gtggcttcat atgtattatt ttatattgtā cttttttcat tattgatggt ttggacttta 240
ataagaāāāā ttccatagtt ttāatātācc cagaagtgag ācāāttgāā cagtgtattc 300
tgāāāāāāā cācāctāact gaacagaagt gaatgcttat ātatattatg ātagccttāā 360
acctttttcc tctāatgcct tāactgtcāā āāāatāāā ccttttāāāg cataggactā 420
tagtcagcat gctagactga gaggtāāāā ctgatgcaat tagāacaggt actgatgctg 480
tcagtgttta acactatggt tagctgtgtt tatgctat 518

```

<210> 444

<211> 76

<212> DNA

<213> Homo sapiens

<400> 444

gctgctcatg agcagcatgg acgacctgat acgccactgt aacgggaagc tgggcagcta 60
caaaatcaat ggccgg 76

<210> 445

<211> 308

<212> DNA

<213> Homo sapiens

<400> 445

gagcattatg agcattatgt cagaatagaa tagaattggg gttcgatctt aacaggccag 60
aaatgcctgg gtttttttgg tttgtttttg tttttgtttt tttatcaaat cctgcctgac 120
tgtctgcttg ttttgcctac catcgtgaca tctccatggc tgtaccacct tgtcgggtag 180
cttatcagac tgatgttgac tgttgaatct catggcaaca ccagtcgatg ggctgtctga 240
catttttgta tctttcatct gaccatccat atccaatgtt ctcatttaaa cattaccag 300
catcattg 308

<210> 446

<211> 530

<212> DNA

<213> Homo sapiens

<400> 446

tgtgttaatg ttttctagca tgtactctgg tttcaacaga cacaaattta tatgttaacc 60
cagttttctt gccgttctgt aagtgtttta ttcttagtgt gatttttttc cattgggatg 120
tttttgattg aacttggtca ttttgttttg ctggggagga aaataaaca ttttactttt 180
ttcctttagg agcattatga gcattatgtc agaatagaat agaattgggg ttcgatctta 240
acaggccaga aatgcctggg ttttttttgt ttgtttttgt ttttgttttt ttatcaaata 300
ctgcctgact gtctgcttgt tttgcctacc atcgtgacat ctccatggct gtaccacctt 360
gtcgggtagc ttatcagact gatgttgact gttgaatctc atggcaacac cagtcgatgg 420
gctgtctgac attttggtat ctttcatctg accatccata tccaatgttc tcatttaaac 480
attaccagc atcattgttt ataatcagaa actctggtcc ttctgtctgg 530

<210> 447

<211> 104

<212> DNA

<213> Homo sapiens

<400> 447

ggacgtgcct ggaaccacct cgtccacgtc cacgtccacc tggggggctc gggaggctag 60
gcccctcttc aaaggcccac cagcccggcg ctcatgctga gccc 104

<210> 448

<211> 417

<212> DNA

<213> Homo sapiens

<400> 448

tatctttcat ctgaccatcc atatccaatg ttctcattta aacattaccc agcatcattg 60
tttataatca gaaactctgg tccttctgtc tgggtggcact taaagtcttt tgtgccataa 120
tgcagcagta tggagggagg attttatgga gaaatgggga tagtcttcat gaccacaaat 180
aaataaagga aaactaagct gcactgtggg ttttgaaaag gttattatac ttcttaacaa 240
ttcttttttt cagggacttt tctagctgta tgactgttac ttgaccttct ttgaaaagca 300
ttcccaaaat gctctatttt agatagttaa acattaacca acataatttt ttttagatcg 360
agtcagcata aatttctaag tcagcctcta gtcgtgggtc atctctttca cctgcat 417

<210> 449

<211> 630

<212> DNA

<213> Homo sapiens

<400> 449

tttttttttt tttttttttt ttggaatcgc aagaattccc aggccctctt tttatttaca 60

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gtgataccaa accatccact tgcaaattct ttggtctccc atcagctgga attaagtagg 120
tactgtgtat ctttgagatc atgtatttgt ctccactttg gtggatacaa gaaaggaagg 180
cacgaacagc tgaaaaagaa ggggtatcaca ccgctccagc tggaatccag caggaacctc 240
tgagcatgcc acagctgaac acttaaaaga ggaaagaagg acagctgctc ttcattttatt 300
ttgaaagcaa attcatttga aagtgcataa atgggtcatca taagtcaaac gtatcaatta 360
gaccttcaac ctaggaaaca aaattttttt ttctatttaa taatacacca cactgaaatt 420
atttgccaat gaatcccaaa gatttggtag aaatagtaca attcgtattt gctttcctct 480
ttcctttctt cagacaaaca ccaaataaaa tgcaaggtag agagatgaac cagcactaga 540
ggctgactta gaaatttatg ctgactcgat ctaaaaaaa ttatgttggt taatgttaaa 600
ctatctaaaa tagagcattt tgggaatgct

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<210> 450

<211> 596

<212> DNA

<213> Homo sapiens

<400> 450

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tttttttttt tttttttttt tttggggtaa aagttatatc ttattgccat gctacaaaat 60
gtatgaagtt ggcactgata gggagaaata gagaacaaag ggtgggaagg gatagagga 120
aaattatgtt gttacatata caacaagggt ttattttaat taacagtggg tacgttttgc 180
caatattaaa aatgcaaacc aaaattttaa atgctgatct gaaacagcat taagatacaa 240
tgtatgcata gtacagtatc acttatgtct ttttattaga gaaatatgga atgtttataa 300
aagaaattaa ccatgggggt aaaattcata tttcatatac aatttggcaa tggtagtccc 360
actgttggac aattttttat aaaagaaaaa attaaaaatc taataagcta cctttataca 420
aagttgctat atttatgcct ttacgttaga aaaaaacatt tataatgcaa attaggacat 480
acaatagtct tacaatacta tacaatgtaa tgaaaataaa acataacaca aagtttgtcc 540
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<210> 451

<211> 559

<212> DNA

<213> Homo sapiens

<400> 451

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tggcggggtg ctttccaaaa tggcgcgggg gctgaaggct gcagccgcga atgccgtagg 60
gcttttttcc agacttcaag ctccatttcc aacagtaaga gcttcttcca catcacagcc 120
cttggatcaa gtgacagggt ctgtgtggaa cctgggtcga ctcaaccatg tagccatagc 180
agtgccagat ttggaaaagg ctgcagcatt ttataagaat attctggggg ccaggttaag 240
tgaagcggtc cctcttctg aacatggagt atctgttggt tttgtcaacc tgggaaatac 300
caagatggaa ctgcttcac cttggggacg tgacagtcca attgcagggt ttctgcagaa 360
aaacaaggct ggaggaatgc atcacatctg catcgagggt gataatatta atgcagctgt 420
gatggatttg aaaaaaaaaa aagatccgca gtctaagtga aggggtcaaa ataggagcac 480
atggaaaacc agtgattttt ctccatccta aagactgtgg tggagtcctt gtggaactgg 540
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```

<210> 452

<211> 638

<212> DNA

<213> Homo sapiens

<400> 452

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tggcggggtg cgttccaaat ggcgcgggtg ctgaaggctg cagccgcgaa tgcgtaggg 60
cttttttcca gacttcaagc tcccattcca acagtaagag cttcttccac atcacagccc 120
ttggatcaag tgacagggtc tgtgtggaac ctgggtcgac tcaaccatgt agccatagca 180
gtgccagatt tggaaaaggc tgcagcattt tataagaata ttctgggggc ccaggttaagt 240
gaagcgggtc ctcttctga acatggagta tctgttggtt ttgtcaacct gggaaatacc 300
aagatggaac tgcttcatcc attgggacgt gacagtccaa ttgcagggtt tctgcagaaa 360
aacaaggctg gaggaatgca tcacatctgc atcgagggtg ataattataa tgcagctgtg 420
atggatttga aaaaaaaaga agatccgcag tctaagtga ggggtcaaaa taggagcaca 480
tggaaaacca gtgatttttc tccatcctaa agactgtggt ggagtccttg tggaaactga 540
gcaagcttga cttatatttg caagcaacta aattaattga cctgaaaaag cctatcaaat 600
actatcaaaa tgtactatga cattgagtc ttcactgc 638

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<210> 453
 <211> 57
 <212> DNA
 <213> Homo sapiens

<400> 453
 gactacattt ggggatgatg cattccttta agattgaatg attctgccct tgggcag 57

<210> 454
 <211> 538
 <212> DNA
 <213> Homo sapiens

<400> 454
 gccgggctgc taattctggt taattgttcc tgggctaaaa agaattagaa ggaagctgtc 60
 tgtttccac tgcggttatg tttcagtaaa ttagacgtac tttctgatga atactaatta 120
 gccactgagc atttgacccc actgtctttg ctgggttgtg gcagaacagc tgccaagttg 180
 cccaagaccc tcgctatccc atccccctct ctgtctttcc acttttgggc ttcctttgcc 240
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 agtgtctcat ggtttttcct tgttgacaaa attcaaaact cacacatgtg tagtctaata 360
 atagcgctag gatttaaaga aagtgtttta gtgctgtgct tatttaggac tacatttggg 420
 gatgatgcat tcctttaaga ttgaatgatt ctgcccttgg gcagagctcc caattaggga 480
 ggattaggta agctttttgt ggcgatgggt aataccattc ttttctcat tgtgctg 538

<210> 455
 <211> 548
 <212> DNA
 <213> Homo sapiens

<400> 455
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 gtgacggtcg gtgtgtcctg cagacctgaa gccaaagatca agggggcttg agcaccagga 120
 gccccgcag ttgctgaatg accagcggag ggcaggtgcc agcctgtggc aaaataggaa 180
 agaaaaggac aggatgggga cttcaccatt tttttcagcc ttaaattggt ccttaaacct 240
 tcatgtcctt ttctctaata tgtgttcttg ttttgtaaaa taaaaaagtt tgtaaccctg 300
 agttctctaa agatatacat tcttttttac tggtttgtga agtcagaagg atgagagctg 360
 ctatttcttg gaaccgtgca ataaatatta gcatattcag tctcggttct gcctagagga 420
 cctatttgc tttctttatc tcgtaaccca taactcacag gacattaacc aggggtgtcca 480
 agaacagtct gggaaagttt tgataattac ttcagcattg ctgtgtgatg ggagacattg 540
 ttttaaaa 548

<210> 456
 <211> 354
 <212> DNA
 <213> Homo sapiens

<400> 456
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 ctcagcagtg gtgacggtcg gtgtgtcctg cagacctgaa gccaaagatca agggggcttg 120
 agcaccagga gccccgcag ttgctgaatg accagcggag ggcaggtgcc agcctgtggc 180
 aaaataggaa agaaaaggac aggatgggga cttcaccatt tttttcagcc ttaaattggt 240
 ccttaaacct tcatgtcctt ttctctaata tgtgttcttg ttttgtaaaa taaaaaagtt 300
 tgtaaccctg agttctctaa agatatacat tcttttttac tggtttgtga agtc 354

<210> 457
 <211> 570
 <212> DNA
 <213> Homo sapiens

<400> 457
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taacatatag	tagtaatgat	ttataaaaata	tttgccctccc	ttagaccaga	gcagctacta	120
aatttgattt	taataataag	ataaacaat	taataagatc	acaaagttgt	tatgtaataa	180
cataaacagc	tgtgttaaaa	ttagtagtga	cccatatcaa	agaaacacaa	ttacaaagag	240
attaagaagg	ataatattta	aagtgtagct	ttactcagtc	ttttgtgtga	aggtattctt	300
agggataaaa	caatgtattt	ggaagctgct	ggaagaatat	ggtgcaaaga	atatttttaa	360
atgcttgtga	atgttctgta	accacaaaca	tagatacata	acagatcaaa	gacatatttt	420
agactgccat	gtggacttaa	atcatgggag	gcggaagagt	ggctcccaa	agaggactat	480
atcgtaatac	cagaacttgt	gaatatatta	ctttaagtgg	caaaaggagc	tttacagatg	540
tgattaaaaa	taaggacctt	gaaatggggg				570

<210> 458

<211> 540

<212> DNA

<213> Homo sapiens

<400> 458

aactagactt	cttttatagg	attcatttaa	aggagaataa	aataatgaat	gtgaaactca	60
tattagagct	taacatatag	tagtaatgat	ttataaaaata	tttgccctccc	ttagaccaga	120
gcagctacta	aatttgattt	taataataag	ataaacaat	taataagatc	acaaagttgt	180
tatgtaataa	cataaacagc	tgtgttaaaa	ttagtagtga	cccatatcaa	agaaacacaa	240
ttacaaagag	attaagaagg	ataatattta	aagtgtagct	ttactcagtc	ttttgtgtga	300
aggtattctt	agggataaaa	caatgtattt	ggaagctgct	ggaagaatat	ggtgcaaaga	360
atatttttaa	atgcttgtga	atgttctgta	accacaaaca	tagatacata	acagatcaaa	420
gacatatttg	agactggcat	gtggacttaa	atcatgggag	gcggaagagt	ggctcccaa	480
agaggactat	atcgtagtac	cagaacttgt	gaatatatta	ctttaagtgg	caaaaggagc	540

<210> 459

<211> 622

<212> DNA

<213> Homo sapiens

<400> 459

acttaagatt	ttttcaatgt	aagaaaaatg	caatgaaata	atagctgcaa	ataccacta	60
ctaacaattg	cttggccttc	ttatatagac	ctcccgaggt	tctcatcttt	tacatttcag	120
gagtagaatc	agttaaaaac	taatctttat	atgtaaggga	tgagagagag	aaagaggagg	180
gtatgtgtat	gcacacatgt	gtgtgtgtgt	ggtgggtagt	aattttaatt	caatgattta	240
ctagagttcg	atgtcgtttg	ctgataaatg	aagcaggagg	aagagccagg	tttgaggagg	300
acgagagaat	gagttccatt	tgtctcatat	agaagttgaa	gtaactgagt	gatgatgggt	360
agagatgtcc	ctcaggggta	gccacagtat	tttattttact	ttttattcac	cacatgcagc	420
aaggagcttt	gttctccaaa	atgctgtcaa	ttatttttct	aaattacagg	tttgattgct	480
tcactgtatt	ttcatgtctc	attactacct	ttacgcttaa	aaccagaaac	tgtgccacag	540
cgttaaagat	tctgctaact	tttaaaatac	agaactctgg	agatgccata	attagattgc	600
agatttatga	gtcttctgga	ta				622

<210> 460

<211> 378

<212> DNA

<213> Homo sapiens

<400> 460

acaatgggtt	tggtctctgc	cttataaatt	gggggattct	agaggagtct	gcttttctcc	60
caagaaggac	ctcttctttt	cttgcttttc	atatgctctc	cttgagatat	cttgggtatt	120
ctcatggctt	taaatagcac	ttatatccag	aagactcata	aatctgcaat	ctaattatgg	180
catctccaga	gttctgtatt	ttaaaagtta	gcagaatctt	taacgctgtg	gcaaagtctc	240
tggttttaag	cgtaaaggta	gtaatgagac	atgaaaatac	cgtgaagcca	tcaaacctgt	300
aatttaaaaa	aataattgac	agcatttttg	agaacaaagc	tccttgctgc	atgtggggaa	360
taaaaagtaa	ataaaata					378

<210> 461

<211> 396

<212> DNA

<213> Homo sapiens

<400> 461

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ccttctgctc tacgagaact atgggcagtc ggaaacggga ctaatttgtg ccacctactg 60
gggaatgaag atcaagccgg gtttcatggg gaaggccact ccaccctacg acgtccagggt 120
cattgatgac aagggcagca tcctgccacc taacacagaa ggaaacattg gcatcagaat 180
caaacctgtc aggcctgtga gcctcttcat gtgctatgag ggtgacccag agaagacagc 240
taaagtggaa tgtggggact tctacaacac tggggacaga ggaaagatgg atgaagaggg 300
ctacatttgt ttcctgggga ggagtgatga catcattaat gcctctgggt atcgcatcgg 360
gcctgcagag gttgaaagtg ctttggtgga gcaccc 396

```

<210> 462

<211> 529

<212> DNA

<213> Homo sapiens

<400> 462

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tttttttttt tttttttttt ttttttcggt agaaatgggg ttttaccatg ttgcccaggc 60
tagtctcgaa ctctctgggt taagcaatcc acacacctcg cttccaaaaa agctgggggt 120
acagggtgtga gccatcacac ccagcctaata atacaatctc aaatatattt ttttaaatca 180
ttacttactg aactataaag taaaactaat ttttagacag cattttaata catattttac 240
tttttaagg ttataaagaa aacactaaca atatggaaaa tgcataattt aagaaaattg 300
aaatcaataa taatcttatg gctcaaaatc attagtgtta atattttgat acctaccttc 360
cccatctttt gcctacgaat actgggttaa gagtttttaa atagtttgt cttgctttg 420
taattttcgt atgttctcac aaaagagaag ctgaggaagc atttggtat tgggaaaatt 480
aattaataga tgtaactta ccaagatata ctataataga ttagacagc 529

```

<210> 463

<211> 485

<212> DNA

<213> Homo sapiens

<400> 463

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tttaaagtaa atgactcatg ttgaggaaag aggttattac ctaaactctg actgcccgt 60
aaggaaattc ccttaacctc tattctgggt tcctatttca aaatgggtgt gtaggagggt 120
aatggaagtt agttgggtgc tatgatccaa aaactctatg ggtgaaaatt taaggtacag 180
atttcttatt taatcggtta acagctttag ttgtgagttc tatgtcctg tataatggat 240
cctgattatt aatgcattaa atatgcattc agtgaattca aatgttgcta attattctt 300
taccaatcaa agaaaactca aagcatggga ttaagagggg ttggccaaaa gtatttggac 360
caggttgcat accaggacca tgaagaaatt gagaacagag cctacatctt ttatactatg 420
gctcaaagca agggctgttg gaatgtgctg cttctccaaa gtaggactta tgaaaaaatg 480
agggt 485

```

<210> 464

<211> 576

<212> DNA

<213> Homo sapiens

<400> 464

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tatcagcatc tgtagaggag aaagcagaat aagcactggg gtatttgata gacttgagaa 60
taagagaacc ccaaagttgt caataggtat ttgctagaaa gttcagtggg tcagggtggg 120
aatagcagct gaaattggca gggattttga ctattcaaat aatgggtgag tagaagggt 180
ctgtggaata gccattatga cctcttgaaa ccaggcaact aggggggtccc ttctagaatg 240
atgctgcgta cctaagaaat tcagtaggga gtggagtcaa aatgatcaga aaagatagag 300
atagtgtgg caaaagatga tctaagagtg tgtgtgtatg tgtgtgagtg agagagagaa 360
atctcaagaa atagtggcta tgggtgtgaa cactacatga aagcaacctt aaacagctgt 420
gtgaagttag aaaaggtact ctggaccata ttgccctgta aaagctcagg aaaactaatt 480
ttgcataaac ataagcaaca ggaaattatt gctgtcaaat ctcatcaga gttattgtac 540
aaaaaaagag acaagaatcc ctatagacaa tgaaag 576

```

<210> 465

<211> 459

<212> DNA

<213> Homo sapiens

<400> 465

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ttatctaacg tttctaacag ggggtgttaat gatattagca gcaagagcta tgagaaataa 60
cttttagacat tatttcattg aaccttccca actgaaatta ttttatgatg ttataacatg 120
gatagtaact caagtagcaa taagttacac agttgtgcca tttgtgcttc tttctataaa 180
accatcactc acgtttttaca gctcctggta ttattgcctg cacattcttg gtatcttagt 240
attatcgttg ttgccagtga aaaaaactca aagaagggaag aatacacatg aaaacattca 300
gctctcaciaa tccaaaaagt ttgatgaagg agaaaattct ttgggacaga acagtttttc 360
tacaacaaac aatgtttgca atcagaatca agaaatagcc tcgagacatt catcactaaa 420
gcagtgatcg ggaaggctct gagggctgtt tttttttt 459

```

<210> 466

<211> 250

<212> DNA

<213> Homo sapiens

<400> 466

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tatacccagg atattatcta acgtgtctaa caggggtgtt aatgatatta gcagcaagag 60
ctatgagaaa taacttttaga cattatttca ttgaaccttc ccaactgaaa ttattttatg 120
atgtttataac atggatagta actcaagtag caataagtta cacagtgttg ccattttgtgc 180
ttctttctat aaaacatca ctcacgtttt acagctcctg gtattattgc ctgcacattc 240
ttggtatctt 250

```

<210> 467

<211> 509

<212> DNA

<213> Homo sapiens

<400> 467

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atactttatc tatttttcggg caacttgctt cctcatgaa ccatggacat ctcaatgtgc 60
cattacacac aggagtata tgtaggtat tggtgtccca ttttacagaa gagaatccgc 120
aaggttcaca gagtgaatca taggcataaa gtccttcagg tggtaaatgg caaggctggc 180
gttccaacca gtcttctctg gctccaggga ctggctcctt cagactacat ttcaccagct 240
gcctccagga acagaagacg ggaattcacc ttctatgcga catataccag aaacgtggac 300
ctcagccacc ctgggtccta ttgatcccc agggccttca tttggccctc gaataaaaac 360
cttatttttt tatctcctta cctttcccag aattcatagt aggacttggc tggtgaaagg 420
ctggttgctg agaaggctac agtgtggcta ggctgcagtt ccctgttatt acattgcccc 480
aggattaat attgtatatt taggcagct 509

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<210> 468

<211> 554

<212> DNA

<213> Homo sapiens

<400> 468

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ggattttcaa tctgagatga tactttatct attttcgggc aacttgcttc cctcatgaac 60
catggacatc tcaatgtgcc attacacaca ggagttatat gttaggtatt gttgtcccat 120
tttacagaag agaatccgca aggttcacag agtgaatcat aggcataaag tccttcaggc 180
ggtaaatggc aaggctggtg ttccaaccag tcttctcttg ctccaggac tggctccttc 240
agactacatt tcaccagctg cctccaggaa cagaagacgg gaattcacct ttcatgacgac 300
atataccaga aacgtggacc tcagccaccc tgggtcctat ttgatcccca gggccttcat 360
ttggccctcg aataaaaacc ttattttttt atctccttac ctttcccaga attcatagta 420
ggacttggtc ggtgaaaggc tgggttgctga gaaggctaca gtgtggctag gctgcagttc 480
cctgttatta cattgcccc ggtattaata ttgtatattt aggcagctgt tctcatccgt 540
gcctggcagc gaaa 554

```

<210> 469

<211> 537

<212> DNA

<213> Homo sapiens

<400> 469

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attctgaccc cattgtgcac cttagtcatg gcaaactttc cagttgctcc ttgccaaaac 60
tcaagaataa aagggcccaa gctagagagg ctgtcctcac aagcatcagc tgctgggggc 120
ttccactcat tttcctctga aacaacagag aaagagacca tctctcattc gcagagcagc 180
ccaaggcctt ctgaggagac tgtgagtctc ctctaagtca tttctctctg ctttgtagca 240
gtggagctac caaggggtgag atgagcaggt tgagaggcct ctgaagcctg ctgggcacaa 300
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gctgctgctc agaggcccta ggtgctgcgc tgctcactgc cctcacgtct ctgggacttc 420
cacacataaa gccatctctt tccattgcac tatggcactt gtagggagga tcccacactt 480
agggcccaaa atgagaccat ttgagtcaaa tttctaattg tctttcaaat tttatta 537

```

<210> 470

<211> 492

<212> DNA

<213> Homo sapiens

<400> 470

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attctgaccc cattgtgcac cttagtcatg gcaaactttc cagttgctcc ttgccaaaac 60
tcaagaataa aagggcccaa gctagagagg ctgtcctcac aagcatcagc tgctgggggc 120
ttccactcat tttcctctga aacaacagag aaagagacca tctctcattc gcagagcagc 180
ccaaggcctt ctgaggagac tgtgagtctc ctctaagtca tttctctctg ctttgtagca 240
gtggagctac caaggggtgag atgagcaggt tgagaggcct ctgaagcctg ctgggcacaa 300
tgctctgtga taagttttcag ctccactgga gcttatcatc caccagcaat cgacttcatg 360
gctgctgctc agaggcccta ggtgctgcgc tgctcactgc cctcacgtct ctgggacttc 420
cacacataaa gccatctctt tccattgcac tatggcactt gtagggagga tcccacactt 480
agggcccaaa tg 492

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<210> 471

<211> 509

<212> DNA

<213> Homo sapiens

<400> 471

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aagacattca aattagccac cactggagta gatgacctaa aagttcttac aactctcaat 60
tataccagtg gatgtctcga ttagcactta ttataaaaat taaaatttat aattcaacat 120
ttataaccatc cagaaaaagt taaaatatat taatagccta tttctcttca ataaagcgta 180
tatataactc tatttggttaa tgtttctatt ctccatgaca ttctgtttat agataagccc 240
tatgtatatt ctagtcaagt gctaattctt tgaatgaagc tgaattaggt agtcaactac 300
tagatgtatc ctgaaaagca agtaattgtt atatttcatt tattttatac ataagagcta 360
cagactgttg tcacaatctt ttcaagggtc attaaattca ttattttaac taacattttt 420
gaacatctgt cttatgttgt taattgagga catttctgaa tgtataacaa cataagaata 480
atagttgtta aacttcaaag agatgacag 509

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<210> 472

<211> 649

<212> DNA

<213> Homo sapiens

<400> 472

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caaattagcc accactggag tagatgacct aaaagttctt acaactctca attataccca 60
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tccagaaaaa gttaaaatat attaatagcc tatttctctt caataaagcg tatatataac 180
tctatttggt aatgtttcta ttctccatga cattctgttt atagataagc cctatgctat 240
ttctagtcaa gtgctaattc cttgaatgaa gctgaattag gtagtcaact actagatgta 300
tcctgaaaag caagtaattg gtatatattc tttattttat acataagagc tacagactgt 360
tgtcacaatc ttttcaaggg ctattaaatt cattatttta actaacattt ttgaacatct 420
gtcttatgtt gtttaattgag gacatttctg aatgtataac aacataagaa taatagtttt 480
taaacttcaa agagatgaca ggttaattgag taaaggagaa atatgaaata tcacagaatt 540
ccttgacact aaatgatgtt ttgcaaatac tgaacagaat gatgtttgta aactttccac 600
tggttttcaa gagtcccaaa acattaggaa aatgtacatc acctaactt 649

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<210> 473
 <211> 494
 <212> DNA
 <213> Homo sapiens

<400> 473
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 atagttgctt tggatatcaa ctttaatacct aacccatata agatccttat tatataattt 180
 tgtgatcagt aaaatgatat tttaaagagt gatcttaaaa atatgacctg gtcattgcac 240
 aacgtttgca tttgaaatga atttttgtac tatagggtgg atatggagtt attcagtgc 300
 agtgtgtgct taatatcaaa ccctatgcaa ggagctatgt ctagattttt ggtccgaatt 360
 tgcctccttc aagcctacta gtgtgagatg gaaaaaaatc gattgctctt ttaatatatt 420
 ttccattttg aaattctcga cacttgaatg aaggcagtag aagcctcttt ttggatttct 480
 cttctaataa caaa 494

<210> 474
 <211> 630
 <212> DNA
 <213> Homo sapiens

<400> 474
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 cactggacta gataaaaaat ggtgctaata tttatgtagc ttgatgctat agttgctttg 120
 gtatcaaaact taatacctaa cccatataag atccttatta tataattttg tgatcagtaa 180
 aatgatattt taaagagtga tcttaaaaaat atgacctggc cattgcacaa cgtttgcat 240
 tgaaatgaat ttttgacta taggggtggat atggagtatt tcagtgcagg tgtgtgctta 300
 atatcaaacc ctatgcaagg agctatgtct agatttttgg tccgaatttg cctccttcaa 360
 gcctactagt gtgagatgga aaaaaatcga ttgctctttt aatattattt ccattttgaa 420
 attctcgaca cttgaatgaa ggcagtagag gcctcttttt ggatttctct tctaataaca 480
 aaactttatt tagggaagg ttcctgtgtc tatcgtaagt ttgttttgag cactgcattc 540
 acttttaaaat tctggaggaa caaaggctgg gcacataatc acaaagccca ggccacacaa 600
 taattccggg gttgtatttt ctaagaacta 630

<210> 475
 <211> 156
 <212> DNA
 <213> Homo sapiens

<400> 475
 gggggagata aggcaaagag gcacttttgg atttctccat ctgagcagct ctgtgattca 60
 ttatctgttc tagaaagcag cacacgcagt tccagcaaaa aaaaaaaaaa aaaaaaattt 120
 tttttttttt cccccctttt tttttttttt ttcccc 156

<210> 476
 <211> 579
 <212> DNA
 <213> Homo sapiens

<400> 476
 attccggtgc tgtcggcggc cgggtcccga tgagcctcct gttgcctccg ctggcgctgc 60
 tgctgcttct cgcggcgctt gtggccccag ccacagccgc cactgcctac cggccggact 120
 ggaaccgtct gagcggccta acccgcgccc gggtagagac ctgcggggga tgacagctga 180
 accgcctaaa ggaggtgaag gctttcgtca cgcaggacat tccattctat cacaacctgg 240
 tgatgaaaca cctccctggg gccgacctg agctcgtgct gctgggcccgc cgctacgagg 300
 aactagagcg catccactc agtgaaatga cccgcgaaga gatcaatgcg ctagtgcagg 360
 agctcggctt ctaccgcaag gcggcgcccc acgcgcaggt gccccccgag tacgtgtggg 420
 cgccccgcga gccccagag gaaacttcgg accacgctga cctgtaggtc cgggggcccgc 480
 gcggagctgg gacctacctg cctgagtcct ggagacagaa tgaagcgtc agcatccccg 540
 gaatacttct cttgctgaga gccgatgccc gtccccggg 579

<210> 477

<211> 472
 <212> DNA
 <213> Homo sapiens

<400> 477
 ggcttagcgg ataacaattt cacacaggag ctagcagaca ccacaagata ccaacagagc 60
 ttctgaaaca gatacccata gcattggaga gaaaaacagc tcacagtctg aggaagatga 120
 tattgaaaga aggaagaag ttgaaagcat cttgaagaaa aactcagatt ggatatggga 180
 ttggtcaagt cggccggaaa atattccccc caaggagttc ctctaaacac ccgaagcgca 240
 cggccaccct cagcatgagg aacacgagcg tcatgaagaa agggggcata ttctctgcag 300
 aattttctgaa agatttcctt ccattctctgc tgcctctctca tttgctggcc atcggtattg 360
 ggatctatat tgggaagcgt gtgacaacct ccaccagcac cttttgatga agaactggag 420
 tctgacttgg ttcgttagtg gattacttct gagcttgcaa catagctcac tg 472

<210> 478
 <211> 355
 <212> DNA
 <213> Homo sapiens

<400> 478
 tctacactta aagctttgga gcaattccca tcgaccagag ttggtccgac cagccttggga 60
 aaggtcactg aaaaatcttc aattggacta tgggtgacct tatcttatac attttccatt 120
 gtctgcaaag ccaggtgagg aagtgatccc aaaagatgac aatggaaaaa tactatttga 180
 cacagtggat ctctgtgcca catgggaggg catggagaag tgtaaagatg cacgattggc 240
 caagtccatc ggggtgtcca acttcaacca caggctgctg gagatgatcc tcaacaagcc 300
 agggctcaag tacaagcctg tctgcaacca ggtggaatgt catccttact tcaac 355

<210> 479
 <211> 510
 <212> DNA
 <213> Homo sapiens

<400> 479
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 ttgtttcctc ccctatctgt attcccaaaa attactttgg ggctaattta acaagaactt 120
 taaattgtgt ttttaattgta aaaatggcag ggggtggaat tattactcta tacattcaac 180
 agagactgaa tagatatgaa agctgatttt ttttaattac catgcttcac aatgttaagt 240
 tataatggga gcaacagcaa acaggtgcta atttgttttg gatatagtat aagcagtgct 300
 tgtgttttga aagaatagaa cacagtttgt agtgccactg ttgttttggg ggggcttttt 360
 tcttttcgga aatcttaaac cttaagatac taaggacgtt gttttggttg tactttggaa 420
 ttcttagtca caaaatatat tttgtttaca aaaatttctg taaaacaggt tataacagtg 480
 tttaaagtct cagtttcttg cttgggggaa 510

<210> 480
 <211> 371
 <212> DNA
 <213> Homo sapiens

<400> 480
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 cttccgtaat ccagtgctgc tgtgattcct ctgcttgccct ggagacgtgg aacctctgtc 120
 tcatcctcct ggaaccttgc tgtcctgac tgtgatagtt caccacctga gatccctga 180
 gccccagggt gcccagaact tccctgattg acctgctccg ctgctccttg gcttacctga 240
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 ccacttcttc ctttctcttt ctctcttccc tcaaaaacta gaaatgtgaa tgaggattat 360
 tataaaaggg g 371

<210> 481
 <211> 543
 <212> DNA
 <213> Homo sapiens

<400> 481

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aattccgttg ctgtcgggtg ctggaggcca tctccagaa ctctcctgac gccaaaatct 60
tctgcctggt gcacaaaatg gatctgggtc aggaggatca gcgtgacctg atttttaaag 120
agcgagagga agacctgagg cgtctgtctc gcccgctgga gtgtgcttgt ttctgaacgt 180
ccatctggga tgagacgctc tacaaagcct ggtccagcat cgtctaccag ctgattccca 240
acgttcagca gctggagatg aacctcagga attttgccca aatcattgag gccgatgaag 300
ttctgctggt cgaaagagct acattcttgg ttatttccca ctaccagtgc aaagagcagc 360
gcgacgtcca ccggtttgag aagatcagca acatcatcaa acagttcaag ctgagctgca 420
gtaaattggc cgcttccttc cagagcatgg aagttaggaa ttccaacttc gctgctttca 480
tcgacatctt cacctcaa atcgtagctga tggtagtcat gtcagatccg tcgatccctt 540
ctg

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<210> 482

<211> 415

<212> DNA

<213> Homo sapiens

<400> 482

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ggcttactca ctatagggtt tttttttttt tcgggtctat tctttaattt tactaaatta 60
ggaacgcagc ttttacagaa caaataaccc caggggacgg ggccccccca ggatctaaca 120
gcttttcagg gagctatgtt gcaagctcaa aagtaatcca ctaacgaacc aagtcaaaact 180
ccagttttta ataaaaagg gctgggggag gttgtcaaac cccttccaat ataaatcccc 240
aatccgatgg ccaccaa atg aaaaagcacc agggatggaa ggaaaacttt caaaattctt 300
gcaaaaaata tgccccctt ttaaatgacc ctcggtttcc taatgctaag gggggccgcc 360
cccttcgggg gttaaaaaag gaactccttg gggggaatat tttccggccg acttg 415

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<210> 483

<211> 240

<212> DNA

<213> Homo sapiens

<400> 483

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ttttttttt taaagtc atg gaggccatgg ggttggttg aaaccacctt tgggggggtcc 60
aatcccttcc ttttttgctt aaattttatg tatacgggtt cttcaaatgc gtggtagggg 120
ggggggcatc catatagctc ctccaggttt atggagggtt cttctactat taggactttt 180
cgcttcaaaa caaaggcttt tcaaatcatg aaaattttta attttcctgc tgttaaaaaa 240

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<210> 484

<211> 293

<212> DNA

<213> Homo sapiens

<400> 484

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ttttttttt aataaatctc ctaaggggat ggctactttt tctatctaaa taataatata 60
tagacctatt cgatcagaga tacaggggac taacaatcac aatcctgtga tcgacatccg 120
aacataagtc actatctatc agaataaaca atgatccaac gaataataga ggagtaaggg 180
gacatgtcca aagcatcagg tatcgtcatg atcgaaaacc actgtcaagc aagacacaaa 240
caaacaaaac agcttttacac acaagtcagc agtccaagcg ttcagtgtcc aag 293

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<210> 485

<211> 221

<212> DNA

<213> Homo sapiens

<400> 485

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ttttttttt tcaagggaca cttaaatggt taacttaagg gatcatcaat ttgacctcac 60
tacctacaaa ggaattttca tcttgctccc atgctgagta gggaaacagg gacaaagtta 120
atcataatac cctacatcaa aaaaaaacta agctaacact gctaactttt tttttaacag 180
gcaaaatata aatatatgcc ctctaaaatg cccaagggtt t

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<210> 486

<211> 563
 <212> DNA
 <213> Homo sapiens

<400> 486
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 gggagccttg gggccagctg gctgctgct ctccagtcaa gtagcgaagc tcctaccacc 120
 cagacaccca aacagccgtg gcccagagg tcctggccaa atatgggggc ctgcctagggt 180
 tgggtgaaca gtgctcctta tgtaaaactga gccctttgtt taaaaaaciaa ttccaaatgt 240
 gaaactagaa tgagagggaa gagataacat ggcctgcagc acacacggct gctccagttc 300
 atggcctccc aggggtgctg gggatgcac caaagtgggt gtctgagaca gagttggaaa 360
 ccctcaccaa ctggcctctt cacttccac attatcccgc tgccaccggc tgccctgtct 420
 cactgcagat tcaggaccag cttgggctgc gtgcgttctg ccttgccagt cagccgagga 480
 tgtagttgtt gctgccgtcg tcccaccacc tcagggacca gagggctagg ttggcactgc 540
 ggccctcacc aggtcctggg ctc 563

<210> 487
 <211> 271
 <212> DNA
 <213> Homo sapiens

<400> 487
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 atgcttgatg ctgcaaagaa caagatgcga gtgaagatca gctatctaata gattgccctg 120
 acgggtgtag gatgcattct catggttatt gagggcaaga aggctgcca aagacacgag 180
 actttaacaa gcttgaactt agaaaagaaa gctcgtctga aagaggaagc agctatgaag 240
 gccaaaacag agtagcagag gtatccgtgt t 271

<210> 488
 <211> 342
 <212> DNA
 <213> Homo sapiens

<400> 488
 ggcttgtaaat acgactcact atagggtctt ttttttttcg aattaaaaaa attccgttag 60
 ctttttctcc atctcctcta attctggtag catctttgga cccctaacac ttggcatctg 120
 ctacttcaga caaacaacc ctatgtaaat gacaaagaag gggcctcca accttctccc 180
 tgtgttacta tttcaaaagc actactcggg gcacaggggt acaaatttct tatggccact 240
 agcatctttt ttcaattttc aaaggaatca tcaaacatct gggtaatta tacttaaatt 300
 acagaagccc ggaatttttag gcaacaggcc cctcatttta cc 342

<210> 489
 <211> 326
 <212> DNA
 <213> Homo sapiens

<400> 489
 tttttttttt aaaaagtcac ggaggccatg gggttggctt gaaaccagct ttgggggggtt 60
 cgattccttc cttttttgtc taaattttat gtatacgggt tcttcaaata tgggttaggg 120
 tggggggcat ccatatagtc actccaggtt tatggagggt tcttctacta ttaggacttt 180
 tcgcttcgaa gcgaaggctt ctcaaatcat gaaaattatt aatattactg ctgttagaaa 240
 aatgaatgag cctaccgatg ataggatgtt tcatgtggtg tatgcatcgg ggtagtcgga 300
 gtaacgtcgg ggcattccgg ataggc 326

<210> 490
 <211> 55
 <212> DNA
 <213> Homo sapiens

<400> 490
 tttttttttt tttttttttg agaaaccggg gggggttttt tttttaaaat tgggg 55

<210> 491
 <211> 558
 <212> DNA
 <213> Homo sapiens

<400> 491
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 ccgcatagcc gcctcttcga ccaggccttc gggctgcccc ggctgccgga ggagtggctg 120
 cagtggttag gcggcagcag ctggccaggc tacgtgcgcc ccctgcccc cgccgccatc 180
 gagagccccg cagtggcgcg gccgcctac agccgcgcgc tcagccggca actcagcagc 240
 ggggtcttcg gagatccggc aactgcgga ccgctggcgc gtgtccctgg atgtcaacca 300
 ctctgccccg gacgagctga cggtaagac caaggatggc gtggtggaga tcaccggcaa 360
 gcacgaggag cggcaggacg agcatggcta catctcccg tgcttcacgc ggaaatacac 420
 gctgcccccc ggtgtggacc ccaccaagt ttctctctcc ctgtccctcg agggcacact 480
 gaccgtggag gccccatgc ccaagctagc cagcagtc aacgagatca ccatcccagt 540
 caccttcgag tcgcgggc 558

<210> 492
 <211> 370
 <212> DNA
 <213> Homo sapiens

<400> 492
 ggctagcgga taacaatttc acacaggatg gattggctcag agtgaattga atattgtaag 60
 tcagccactg ggacccgagg atttctggga ccccgagtt gggaggagga agtagtccag 120
 ccttcagggt ggcgtgagag gcaatgactc gttacctgcc gccatcacc ttggaggcct 180
 tccctggcct tgagtagaaa agtcggggat cggggcaaga gaggtgagt acggatggga 240
 aactattgtg cacaagtctt tccagaggag tttcttaatg agatatttgt atttatttcc 300
 agaccaataa atttctaact ttgcgaaaaa aaaaaagccc tatagttagt cgtattacaa 360
 gccgaattcc 370

<210> 493
 <211> 560
 <212> DNA
 <213> Homo sapiens

<400> 493
 cagccagcat gaccgagcgc cgcgtcccct tctcgtctct gcggggcccc agctgggacc 60
 ccttcgcgga ctggtaccgc catagccgcc tcttcgacca ggccttcggg ctgccccggc 120
 tgccggagga gtggtcgagc tggtaggcg gcagcagctg gccaggctac gtgcgcccc 180
 tgccccccgc cgcctcgag agccccgcag tggccgcgcg cgctacagc cgcgcgctca 240
 gccggcaact cagcagcggg gtctcggaga tccggcacac tgcggaccgc tggcgcgtgt 300
 ccttgatgt caaccacttc gccccggacg agctgacggt caagaccaag gatggcgtgg 360
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 tcacgcggaa atacacgctg cccccggtg tggacccac ccaagtttcc tctcctctgt 480
 cccctgaggg cacactgacc gtggaggccc ccatgcccaa gctagccacg cagtccaacg 540
 agatcaccat cccagtcacc 560

<210> 494
 <211> 443
 <212> DNA
 <213> Homo sapiens

<400> 494
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 tagcctgaga ataggggaaa tcagtgaatg aagcctccta tgatggcaaa tacagctcct 180
 attgatagga catagtggaa gtgagctaca acgtagtacg tgctgtgtag tacgatgtct 240
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 cctagggtct aaagcactgc agcagatcat ttcatattgc ctccgtggag tgtggcgagt 360
 cagctaaata ctttgacgcc ggtggggata gcgatgatta tggtagcatc atcctgtgtg 420
 aaattgttat ccgctaagcc gaa 443

<210> 495
 <211> 249
 <212> DNA
 <213> Homo sapiens

<400> 495
 tttttttttt cgaaggattt ggcaaagatt tgtttttttt tccattttcca gtttttttaaa 60
 gtaaacacag atttgcttaa aataaagctg atttttaaag cccacaaaag ttgaacacaa 120
 aggagaggat taaattcccc aatgcagagt gataaaaagg aaaagatcct gagtaggtgc 180
 cttcagcaaa aaactgatca tccaggggtga tcacctaata atcggagact taattcctta 240
 taatgcaaa 249

<210> 496
 <211> 434
 <212> DNA
 <213> Homo sapiens

<400> 496
 tttccgtatc tgccttcgggc ttccacctca ttttttttcgc tttgcccatt ctgttttcagc 60
 cagtcgccaa gaatcatgaa agtcgccagt ggcagcaccg ccaccgccgc cgcggggcccc 120
 agctgcgcgc tgaaggccgc caagacagcg agcgggtgcg gcgaggtggt gcgctgtctg 180
 tctgagcaga gcgtggccat ctgcgcgtgc gccggggggcg ccgggggcgc cctgcctgcc 240
 ctgctggacg agcagcaggt aaacgtgctg ctctacgaca tgaacggctg ttactcacgc 300
 ctcaaggagc tgggtgccac cctgccccag aaccgcaagg tgagcaaggg ggagattctc 360
 cagcacgtca tcgactacat cagggacctt cagttggagc tgaactcggg atccgaagtt 420
 ggaacccccg gggg 434

<210> 497
 <211> 368
 <212> DNA
 <213> Homo sapiens

<400> 497
 tttttttttg cttatggagg gttcctctac tattaggact tttcgttcg aagcgaaggc 60
 ttctcaaadc atgaaaatta ttaatatattac tgctgttaga gaagtgaatg accctacaga 120
 tgataggatg tttcatgtgg tgtatgcac gccgtagtcc gagtaacgtc ggggcattcc 180
 ggataggccg aaaaagtgtt gtgggaaaaa agttagattt accccgatga atatgatagt 240
 gaaatggatt ttggcgtagg tttggtctag ggtgtaccct gagaataggg gaaatcagtg 300
 aatgaagcct cctatgatgg caaatacagc tcctattgat aggacatagt ggaagtgagc 360
 tacaacgt 368

<210> 498
 <211> 482
 <212> DNA
 <213> Homo sapiens

<400> 498
 ccagccttcc tgtcccgggc cagcgcctctg acatgcagaa ggtgaccctg ggccctgcttg 60
 tgttccctgc aggttttcc gtcctggacg ccaatgacct agaagataaa aacagtcctt 120
 tctactatga ctggcacagc ctccagggtg gcgggctcat ctgcgctggg gttctgtgcg 180
 ccatgggcat catcatcgtc atgagtgcaa aatgcaaatg caagtttggc cagaagtccg 240
 gtcaccatcc aggggagact ccacctctca tcacccagc ctcagcccaa agctgatgag 300
 gacagaccag ctgaaattgg gtggaggacc gttctctgtc cccaggctct gtctctgcac 360
 agaaacttga actccaggat ggaattcttc ctctctgtct gggactcctt tgcattggcag 420
 ggccctcatct cacctctcgc aagagggtct ctttgttcaa ttttttttta tctaaaatga 480
 tt 482

<210> 499
 <211> 489
 <212> DNA
 <213> Homo sapiens

<400> 499
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acacacgctc cagcccttca tcagcctggg cagtcttacc aaaatgttta aagtgatctc 120
agagggggccc atggattaac gccctcctcc caaggctcgt cccatgacat aacactccac 180
acccgccccca gccaaacttca tgggtcactt tttctggaaa ataatgatct gtacagacag 240
gacagaatga aactcctgcg gctctttggc ctgaaagttg ggaatggttg ggggagagaa 300
gggcagcagc ttattgggtg tcttttcacc attggcagaa acagtgagag ctgtgtggtg 360
cagaaatcca gaaatgaggt gtagggaatt ttgcctgcct tcctgcagac ctgagctggc 420
tttggaatga ggtaaagtgc tcagggacgt tgcttgagcc caaatgtgta gtgtggtctg 480
ggcaggcag 489

<210> 500
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 500
ggaatcacccg ctttgccatc ttcaa 25

<210> 501
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 501
aacttctacc gtttcgccac taagg 25

<210> 502
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 502
gaccgtgtac tgcgtgtcgt gcg 23

<210> 503
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 503
gcgtgctgtg cgcatgtgc cag 23

<210> 504
<211> 24
<212> DNA
<213> Artificial Sequence

<220>

<223> Oligonucleotide primer

<400> 504

gccgtcttca ggcaacaact ccca

24

<210> 505

<211> 24

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligonucleotide primer

<400> 505

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/00657

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : C12Q 1/68; A01N 43/04; C07H 21/04; A61K 31/07
US CL : 435/325, 375, 5, 6; 536/24.5; 514/44, 2; 424/130.1

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 435/325, 375, 5, 6; 536/24.5; 514/44, 2; 424/130.1

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
Medline, CaPlus, Embase, Biosis, Cancerlit, WEST

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 99/21994 (HILLMAN et al) 14 October 1998 (14.10.1998)	1-30
Y,P	VACARRO et al. VMP1 Expression Correlates with Acinar Cell Cytoplasmic Vacuolization in Arginine-Induced Acute Pancreatitis. Pancreatology, 2003 Vol. 3 pages 69-74.	1-30
Y,P	DUSETTI ET AL. Cloning and Expression of the rat Vacuole Membrane Protein 1 (VMP1), a new Gene Activated in Pancreas with Acute Pancreatitis. Biochemical and Biophysical Research Communications, 2002 Vol. 290 pages 641-649.	1-30

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier application or patent published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of the actual completion of the international search

16 April 2003 (16.04.2003)

Date of mailing of the international search report

05 MAY 2003

Name and mailing address of the ISA/US

Commissioner of Patents and Trademarks
Box PCT
Washington, D.C. 20231

Facsimile No. (703)305-3230

Authorized officer

Terra C. Gibbs

Telephone No. (703) 308-0196